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ASBMB TODAY

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

The Art *of* Science Communication

Ferroptosis:

Crosstalk between metabolism and biochemical homeostasis

April 13–15 | Chicago

This meeting will focus on the biochemical and molecular aspects of ferroptosis and how they relate to homeostasis and homeostatic disruptions.

Connect with leading experts, present your research and spark new collaborations in this rapidly expanding area.

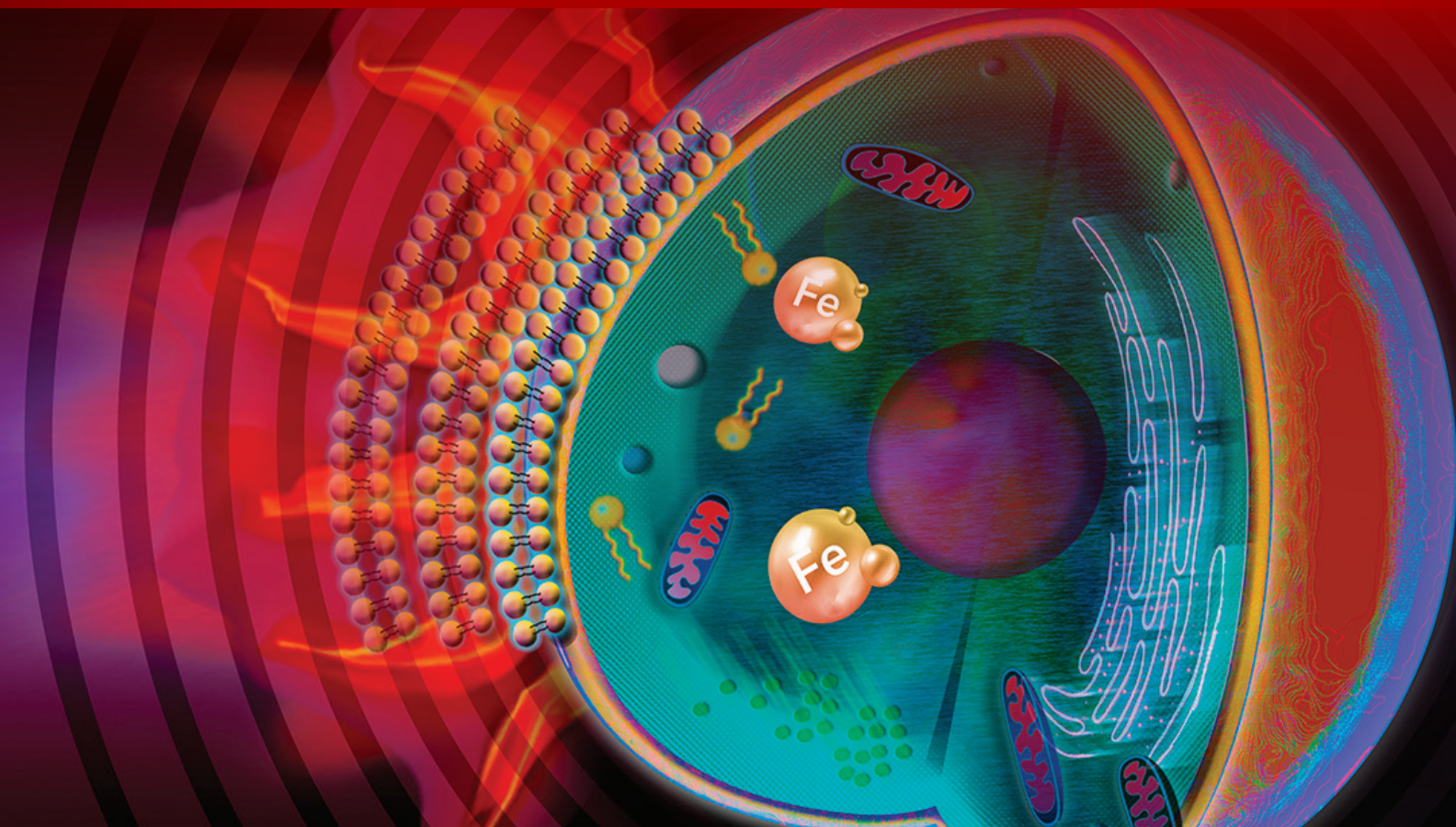
Important dates:

Feb. 18: Abstract submission and early registration deadline

March 12: Regular registration deadline

asbmb.org/meetings-events/ferroptosis

ASBMB
American Society for Biochemistry and Molecular Biology



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ASBMBTODAY
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Commitment, content and community

By Joan Conaway

JOAN CONAWAY

Did you know there is a membership association for people who lead membership associations? I recently learned about the American Society for Association Executives, and I was struck by the opportunities it gives us to understand how other groups lead their fields as we strive to lead ours. The American Society for Biochemistry and Molecular Biology and our staff partners are part of a bigger community that supports organizations like ours: large groups of people joined in common purpose.

One big takeaway is that all associations share common themes, and yet each is unique based on the topics, challenges and opportunities of the communities it serves. I'm so proud to be a member of ASBMB and to take part in our unique, dynamic community. I'm also grateful to have an opportunity to see what we can learn through greater interaction with the larger association community.

An obvious element most associations share is membership. As ASBMB kicks off the 2025 membership year, I wanted to share some thoughts about why people join associations and encourage you to renew for 2025 to take advantage of the unique value ASBMB provides.

Broadly, people join and stay connected with societies for three major reasons: commitment, content and community. What does that mean for ASBMB and for you in renewing your membership?

ASBMB's commitment: ASBMB has been an unwavering North Star guiding biochemistry and molecular biology forward for nearly 120 years. Through that time, it has been the home of giants in our field from 1906 through to today. These scientists transform our fundamental understanding of life in profoundly exciting and promising ways. We need not look further than the Nobel Prizes over many decades to see how our members and the broader BMB community continue to make profoundly important discoveries that make future advances possible.

ASBMB's commitment to serving our community is as strong as ever, and perhaps more important than ever. As the world experiences waves of tremendous change over the decades, ASBMB has been and will be there to support you and your science.

ASBMB's content: ASBMB also provides valuable services to you and the field. Our programs and activities are another crucial — and trusted — aspect of ASBMB value for members. It all starts with the science published and read in ASBMB's outstanding journals, discussed in our small meetings and webinars on emerging topics and debated and shared at the broad ASBMB Annual Meeting. For example, at #ASBMB25, you'll immerse yourself in the latest advancements and expand your knowledge about topics from interorganellar communication and signaling to metabolism and biosynthesis to new frontiers in enzyme and pseudoenzyme research and beyond.

Other ASBMB programs provide the latest insights on funding priorities from National Institutes of Health agencies and support professional development needs for younger investigators. We also work in Washington to be a strong voice advancing the needs of the BMB community, and we train researchers to be more effective communicators of science in public life. Finally, we are an important leader driving excellence in BMB education for the next generation, ensuring undergraduate students have the strong foundation they need for careers that might lead to academic, industry or public sector career paths, or more likely a bit of all of them.

ASBMB's community: Finally, we know great science happens when people work together to produce and share astonishing new knowledge. And we can only sustain great science when today's leaders support a strong pipeline of early-career professionals and students who will be tomorrow's

innovators. ASBMB serves as a dynamic home for both purposes and professionals, all in service to advancing discovery through biochemistry and molecular biology.

It's also professionally and personally advantageous to be part of this community, and it's simply a lot more fun when we do important work together. Thus, one of my most important and favorite reasons for being a member is simply all of you. Through membership and service on many committees and editorial boards, I have been deeply enriched professionally by knowledge I've gained from you, and each chance to meet someone in the halls of an ASBMB meeting is a new moment to connect. I know you feel the same — because many of you have told me. Our science is stronger, our collaborations are more robust and our impact is more widely seen by being a part of this diverse and vibrant community. And in good times and challenging ones, I find enormous satisfaction and delight in seeing familiar faces each year at the annual meeting or in other ASBMB venues, and it's always exciting to meet new people who become lifelong friends.

Join today to strengthen your work and ASBMB's ability to serve the field.

All associations realize that the world around us is evolving rapidly, and we must adapt ourselves and our larger communities to remain impactful, relevant and welcoming. ASBMB is actively engaged in conversations to determine how we will do that, with input from you. Check out key findings from the latest survey of members and our community in this issue. They will be one important input point as we chart our way forward, and we look forward to sharing more with you in months to come.

Most of all, we hope you too will see the value and importance of ASBMB's commitment, content and community, and will join again for 2025. We are excited to host and serve you in so many ASBMB programs. And I will look for you in Chicago for #ASBMB25!

Joan Conaway (Joan.Conaway@UTSouthwestern.edu) is a professor of molecular biology and the vice provost and dean of basic research at the University of Texas Southwestern Medical Center. She is ASBMB's president.

Member feedback contributes to building a strong ASBMB future

By Joanna Kotloski

The ASBMB member survey results are in. Thank you to the nearly 1,500 members, past members and broader BMB scientists who participated in summer 2024. Conducted every few years, the survey explores community interests, values and needs.

"This survey helps us understand what matters to the biochemistry and molecular biology community and ASBMB members," Membership Committee Chair Rick Page said. "It allows us to shape the society's programs and services in a way that is attentive to our members' needs."

Overall, the survey showed high satisfaction: 85% of members said they are very or somewhat satisfied, and 80% plan to remain members. Among the top three reasons for ASBMB participation, 38% of members said they do so to connect with peers and colleagues, 36% said it is to access science meetings and events and 31% seek primarily to stay up to date on scientific developments.

A key takeaway is that ASBMB members are looking for more ways to engage with emerging science and to enjoy the benefits of a vibrant community and the vital information ASBMB provides.

What are the primary reasons you participate with ASBMB currently?

By member type | Top three selections shown. Base: All members, up to three options

REGULAR (n=303)	EARLY CAREER (n=57)	GRADUATE (n=48)	STUDENT (n=58)
To connect with peers and colleagues (44%)	To connect with peers and colleagues (39%)	To advance my career (42%)	To access science meetings and events (38%)
To access science meetings and events (38%)	To access science meetings and events (35%)	To access science meetings and events (40%)	To advance my career (36%)
To stay current on developments affecting the field (33%)	To support ASBMB's work to increase DEI in the workforce (33%)	To connect with peers and colleagues (38%)	I was encouraged by an employer or mentor to join (31%)

From your perspective, what is the fundamental purpose of ASBMB? In other words, why does ASBMB exist?

n=100 coded open-ended comments; Base: All members

About the respondents

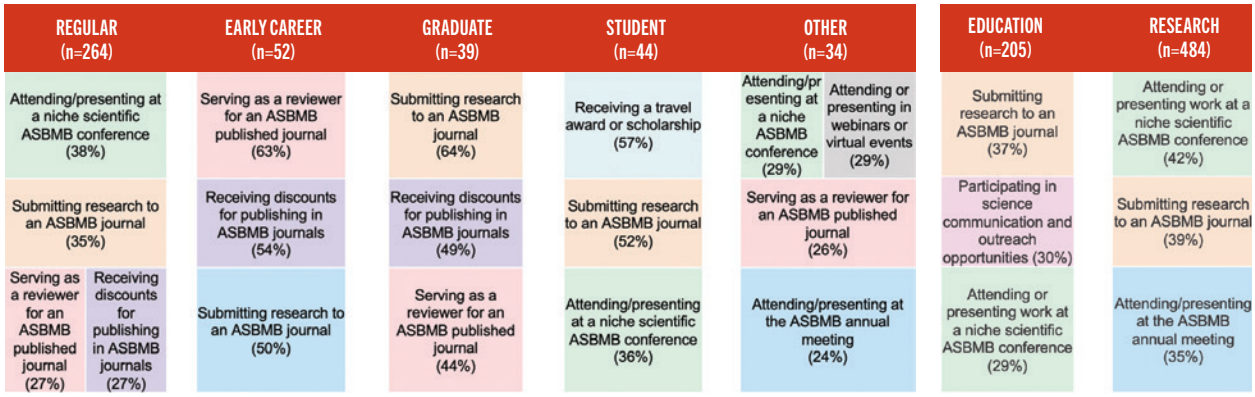
Survey respondents hail largely from the U.S. (75%), followed by Asia (7%), Europe (5%), Africa (4%), the Middle East (2%), Latin America/Caribbean (3%) and Canada (2%). They work in academic settings (44%), medical schools or a hospital/clinic/medical center (22%), a non-research intensive four-year academic institution (12%), nonprofit/government/other area (16%), or industry (5%). Thirty-six percent are faculty/principal investigators or equivalent, followed by graduate students (15%) undergraduates (12%), postdocs (11%) and retired/emeritus (5%). Others include research staff, entry-level industry and other professionals. Fifty-one percent are members.

Why respondents belong: Science and community

When asked about ASBMB's main purpose, respondents were clear: science and community. Rounding out the top three reasons for joining, respondents noted the value of networking and connecting with peers, the scientific events and forums ASBMB creates and the important updates on field directions, challenges and opportunities. Respondents also rated highly ASBMB's information sources such as the society's three journals and

Of the ASBMB programs and services you have not used or accessed recently, which are you considering or are interested in using or accessing in the future?

By member type and area of focus | Top three selections shown. Base: All participants



Would you use any of the resources listed below?

Base: All members, selected either "extremely interested 5" or "4"

	MEMBER TYPE			
	REGULAR	EARLY CAREER	GRADUATE	STUDENT
Presentations and discussions with experts about an important scientific topic	73%	87%	83%	81%
Special interest groups pertaining to specific areas of research or interest	70%	70%	80%	68%
Small starter grants to investigate new research ideas or to generate preliminary data	56%	78%	63%	67%
Training on scientific techniques or tools	51%	70%	76%	83%
Webinars and virtual events on scientific topics	60%	73%	71%	58%
Additional opportunities to network with other ASBMB members	61%	64%	69%	70%
Training on lab management, grant applications, and time management	45%	79%	60%	71%
Training for best practices in publishing	38%	65%	74%	71%
Virtual workshops and courses	42%	70%	66%	55%
Regional meetings	48%	63%	74%	65%
Additional opportunities to become involved in the work of the society	52%	65%	74%	55%

ASBMB Today.

Overall, respondents gave excellent ratings to ASBMB programs and services. The three highest rated activities were advocacy (97% very good or good, n=34); publishing in a journal, reading a journal and receiving publications discounts (93%–94% very good or good, n=155, 661 and 77, respectively); and reading ASBMB Today, travel awards and the IMAGE workshop (93%–90% very good or good, n=515, 91 and 30, respectively).

"(T)he Journal of Biological Chemistry is an extremely valuable, society-run journal," one member wrote; another mentioned ASBMB's "continued support and advocacy for basic science research."

Future interests: Conferences, publishing and more scientific engagement

For members who have not used some ASBMB programs and services recently, presenting and attending at conferences and engaging in ASBMB's publishing activities topped many lists, while some member groups have unique interests.

When asked what future potential offerings they would most value, all member categories overwhelmingly desire scientific "presentations and discussions with experts": 73% of regular members, 87% of early-career members, 83% of graduate students and 81% of undergraduates were extremely or very interested. Among their top 10 priorities, members also highlighted a desire for special interest groups and more training on scientific tools, publishing and management. Earlier-career members and trainees expressed strong interest in virtual events and regional forums.

"These data are invaluable for learning what we can do to ensure ASBMB welcomes every researcher in the fields of biochemistry and molecular biology and is a society they can call home and find their community," Page said.

Joanna Kotloski (jkotloski@asbmb.org) is the ASBMB's membership director.

David B. Berkowitz and **Benjamin Garcia** have been named fellows of the American Chemical Society.


BERKOWITZ

Berkowitz is a professor of chemistry at the University of Nebraska–Lincoln. His lab synthesizes and evaluates small molecule tools for chemical biology.

Garcia is a professor and the head of biochemistry and molecular biophysics at Washington University in St. Louis. His lab uses quantitative mass spectrometry–based proteomics to characterized modified proteins and proteomes. Garcia serves on the editorial board of the American Society for Biochemistry and Molecular Biology journal Molecular & Cellular Proteomics.


GARCIA

Jamie Rossjohn won the 2024 Ceppellini Award from the Monash Biomedicine Discovery Institute. Rossjohn is a professor of biochemistry and molecular biology at the Biomedicine Discovery Institute at Monash University in Melbourne, Australia. His lab investigates the molecular mechanisms underpinning protective and aberrant immunity.


ROSSJOHN

Aswathy Rai has been awarded the Mississippi State University College of Agriculture and Life Sciences, or CALS, Undergraduate Teaching Award-Upper Level, the CALS Teacher of the Year Award and MSU's Donald Zacharias Early Career Undergraduate Teaching Excellence Award. Rai is an assistant teaching professor of biochemistry, nutrition and health promotion at MSU. She is also an ASBMB Today contributor and has written about many papers from American Society for Biochemistry and Molecular Biology journals.


RAI

Robert Langer was named a 2024 Kavli Prize Laureate in Nanoscience by the Norwegian Academy of Science and Letters. Langer is one of nine Institute Professors at the Massachusetts Institute of Technology. The Langer lab studies and engineers polymers and lipids to deliver drugs, such as nucleic acids and proteins.


LANGER

Susan Baserga was recently elected to the American Academy of Arts & Sciences. Baserga is a professor of molecular biophysics and biochemistry, of genetics and of therapeutic radiology at the Yale University School of Medicine. Her lab focuses on understanding how ribosomes are made in eukaryotic cells. She won the American Society for Biochemistry and Molecular Biology's William C. Rose Award, is an ASBMB fellow and chairs the society's Women in Biochemistry and Molecular Biology Committee.


BASERGA

Michael Matunis has been awarded the 2024 Shikani/El-Hibri Prize for Discovery and Innovation from the Johns Hopkins Bloomberg School of Public Health. Matunis is a professor of biochemistry and molecular biology at Johns Hopkins. His research focuses on a class of small ubiquitin-like modifier proteins. The winning research was published last year in the American Society for Biochemistry and Molecular Biology's Journal of Biological Chemistry.


MATUNIS

Ed Tate and a team of researchers won the 2024 Chemistry Biology Interface Horizon Prize: Rita and John Cornforth Award from the Royal Society of Chemistry. Tate is a professor and the chair of chemical biology at Imperial College London. His lab uses medicinal chemistry and chemical synthesis to find therapeutics for infectious diseases, cancer and more.


TATE

Ci Ji Lim and **James Nuñez** have been named 2024 Pew scholars by the Pew Charitable Trusts.

Lim is an assistant professor of biochemistry at the University of Wisconsin–Madison. His lab investigates the structure of human telomere maintenance machinery


LIM


NUÑEZ

and how they confer genome stability.

Nuñez is an assistant professor of molecular and cell biology at the University of California, Berkeley. His lab probes the mechanisms by which cells prevent transposable genetic elements from jumping around the genome.

Ami Bhatt has been awarded the William Dameshek Prize by the American Society of Hematology. Bhatt is a professor of medicine and genetics at Stanford University. Her lab characterizes the dynamics of the microbiome in patients with noncommunicable diseases, such as cancer and cardiometabolic disease, and explores how changes in the microbiome are associated with clinical outcomes.


BHATT

Paul Thompson received a BRIDGE Innovation and Business Development funding award from the University of Massachusetts Chan Medical School. Thompson is a professor of biochemistry and molecular biotechnology at UMass. His lab develops chemoproteomic tools for biomarker discovery and chemical probes to target disease-modifying enzymes.


THOMPSON

Dave Pagliarini was recently named a Howard Hughes Medical Institute Investigator. Pagliarini is a professor of cell biology and physiology at the Washington University School of Medicine in St. Louis. His lab studies how mitochondria operate and the diseases that occur when mitochondria malfunction. Pagliarini has received the Earl and Thressa Stadtman Young Scholar Award from the American Society for Biochemistry and Molecular Biology and is a co-chair of the 2025 ASBMB Annual Meeting.


PAGLIARINI

Bibudhendra Sarkar has been appointed a member of the Order of Canada. Sarkar is a senior scientist emeritus at the Hospital for Sick Children. He discovered that copper-histidine can be used to treat the rare genetic condition, Menkes disease.


SARKAR

William Prinz was recently named a fellow by the American Society for Cell Biology. Prinz is a professor and chair of cell biology at the University of Texas Southwestern Medical Center. His lab studies organelle biogenesis and intracellular lipid trafficking and homeostasis. Prinz is a member of the Journal of Biological Chemistry editorial board.


PRINZ

Carlos Hirschberg has been named an Honorary Professor at the Universidad Andres Bello of Chile.


HIRSCHBERG

Hirschberg is a professor emeritus of molecular and cell biology at Boston University. His lab focused on posttranslational modification regulation during development and disease. He previously served on the Journal of Biological Chemistry editorial board and the American Society for Biochemistry and Molecular Biology Membership and Publications committees.

Bonnie Bassler has been named to Forbes' 50 Over 50 list. Bassler is a professor and chair of molecular biology at Princeton University. The Bassler lab's goal is to understand how bacteria detect multiple sensory cues, and how the integration and processing of this information results in the precise regulation of gene expression.


BASSLER

Karen Fleming has been elected president of the Biophysical Society. Fleming is a professor of biophysics at Johns Hopkins University. Her lab uses experimental and computational methods to investigate membrane protein folding and molecular chaperones. Fleming is an associate editor of the Journal of Biological Chemistry.


FLEMING

Look for more member news details here:

IN MEMORIAM

William L. Smith, former associate editor of the Journal of Biological Chemistry and co-editor-in-chief and associate editor of the Journal of Lipid Research, died October 12. He had been a member of the American Society for Biochemistry and Molecular Biology for more than 40 years. He won the William C. Rose Award and the Avanti Award in Lipids. In his lab, Smith studied signal transduction, eicosanoids, lipid mediators and essential fatty acids.

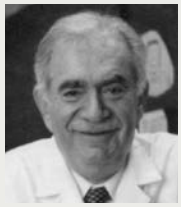
Robert Warren Newburgh, a distinguished developmental and cell biologist and a beloved family man, died Aug. 4 in Tallahassee, Florida. He was 102 and had been a member of the American Society for Biochemistry and Molecular Biology since 1957. In 1972, he showed that 28S ribosomal RNA can be converted to an 18S component via breaks in the RNA's primary structure.

William Albert Catterall, a neuroscientist and pharmacologist at the University of Washington, died February 28 at the age of 77. He was a member of the American Society for Biochemistry and Molecular Biology for more than 45 years and served on the society's Council and the Journal of Biological Chemistry editorial board. He isolated and identified voltage-gated sodium and calcium channels as well as studied their composition and biophysical properties.

Donald John Graves, a biochemist and educator, died June 21 in Woodbury, Minnesota, at the age of 90. He was a member of the American Society for Biochemistry and Molecular Biology for almost 60 years and a former member of the Journal of Biological Chemistry editorial board. His studies showed that natural compounds, such as cinnamon, could lower blood glucose and cholesterol levels.

George Alton Dunaway Jr., emeritus professor of pharmacology at Southern Illinois University School of Medicine, died May 16 in Edmond, Oklahoma. He was 82 and had been a member of the American Society for Biochemistry and Molecular Biology for more than 40 years. He was a committed biochemist whose study on phosphofructokinase isoenzymes contributed to the field's understanding of glycolysis.

Harry Schachter, a leader in the field of glycobiology and glycan synthesis, died April 17 at the age of 91. He was a member of the American Society of Biochemistry and Molecular Biology since 1970 and served on the Journal of Biological Chemistry editorial board in 1983. Schachter's research focused on the activity of glycotransferases, enzymes that mediate the glycosylation or linkage of sugars to accepter substrates.



Sterling Gaylen Bradley, a longtime professor in microbiology and immunology and a well-known science educator, died in Chapel Hill, North Carolina, on May 9. Bradley's research interests covered a wide area of bacterial lipopolysaccharide, interaction between bacterial endotoxin and therapeutic drugs, biology of the amoeba Naegleria fowleri and immunotoxicology.

Roger J. Thibert, a professor emeritus of clinical biochemistry at the University of Windsor, an expert on assay development for medical laboratory diagnostics and a member of the American Society for Biochemistry and Molecular Biology since 1970, died May 30. He described the chemical structure of red Jaffé chromogen, which is used to measure creatinine in amniotic fluid or the serum.

Bengt I. Samuelsson, a professor of medical biochemistry and biophysics at the Karolinska Institute and a lipid biochemist, died July 5 at the age of 90. He shared the 1982 Nobel Prize in physiology or medicine with John Vane and Sune Bergström, for their discoveries concerning prostaglandins and related biologically active substances. He had been an ASBMB member since 1976.

Read news obituaries and personal retrospectives of ASBMB members here:

Meet the 2024 ASBMB MOSAIC scholars

The American Society for Biochemistry and Molecular Biology has welcomed 12 scholars as its fourth cohort for the Maximizing Opportunities for Scientific and Academic Independent Careers, or MOSAIC, program.

Through a cooperative agreement with the National Institutes of Health's National Institute of General Medical Sciences, ASBMB has developed a program to support postdoctoral fellows and new investigators from diverse backgrounds embarking on careers at research-intensive institutions.

Rene Arvola, Ohio State University

Project: Investigating UPF3 paralog function in nonsense-mediated messenger RNA decay and genetic compensation

Donovan Argueta, University of California, Irvine

Project: Nutrition-based interventions to ameliorate pain in sickle cell disease

Cassandra Clift, Harvard Medical School

Project: Defining epigenetic regulation of translational and post-translational modification signaling in aortic valve stenosis via multi-omics approaches

Bryan Cruz, Scripps Research Institute

Project: Extended amygdala somatostatin role in post-traumatic stress and alcohol use disorder

Wagner Dantas, Louisiana State University

Project: The role of nuclear factor erythroid 2-related factor 2 in sarcopenic obesity

Stanna Dorn, California Institute of Technology

Project: Access to strained rings and heterocycles: Applications in the synthesis of bacterial metabolites and chemical building blocks

Katie Dunleavy, University of Minnesota

Project: Defining mechanisms governing Myc stability and its modulation by aurora kinase A

Rebecca Faulkner, University of Texas Southwestern Medical Center

Project: Elucidating the sterol-sensing mechanisms that regulate lipid metabolism

Kasey Girven, University of Washington

Project: Decoding neuropeptide S modulation of orbitofrontal cortex–mediated reward seeking

Elizabeth Kaweesa, University of Illinois–Chicago

Project: Pharmacological potential of combined translation and autophagy inhibition in high-grade serous ovarian cancer

Leonila Lagunes, University of California, Los Angeles

Project: Understanding eukaryotic proteasome assembly regulation

Diego Pedroza, Baylor College of Medicine

Project: Characterization of the metastatic TIME by subcellular spatial profiling

Read profiles of these scholars and learn about the program here:

BMB takes two Nobels

By Marissa Locke Rottinghaus

Victor Ambros and Gary Ruvkun were awarded the Nobel Prize in physiology or medicine for their discovery of microRNA and its role in gene regulation. David Baker, Demis Hassabis and John M. Jumper won the Nobel Prize in chemistry for their work in computational protein design and protein structure prediction.

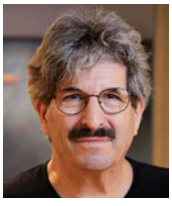
Both discoveries showcase the importance of fundamental research, American Society for Biochemistry and Molecular Biology President Joan Conaway said.

microRNAs and gene regulation

MicroRNAs, small RNA molecules around 21–23 nucleotides long, regulate gene expression by binding to messenger RNA and regulate protein production. Ambros and Ruvkun's work revealed this new dimension of gene regulation.


AMBROS

While studying the nematode Caenorhabditis elegans, Ambros, of the University of Massachusetts, discovered that the lin-4 gene encodes a small RNA, known today as a microRNA, and Ruvkun, of Harvard Medical School, demonstrated that this RNA regulates the lin-14 gene post-transcriptionally. Their complementary findings, published in the 1990s, launched a new field of research.


RUVKUN

In 2000, Ruvkun's discovery of let-7, a highly conserved microRNA found across species, showed that microRNAs are not unique to nematodes but play critical roles in humans and other animals.

According to Olle Kämpe of the Nobel Committee, "It was a new physiological mechanism that no one expected … completely out of the blue. It shows that curiosity research is very important."

Computational protein design and structure prediction

Before 2016, scientists could predict protein structures with only about 40% accuracy.

Janet Smith, a professor of biophysics at the University of Michigan Life Sciences Institute and winner of the 2022 ASBMB Mildred Cohn Award in Biological Chemistry, provided context.

"Ever since 1962, when Chris Anfinson showed the world that the 3D structure of a protein is somehow encoded in the amino acid sequence, 'the protein-folding problem' has been one of the great intellectual challenges of biology," she said.

Collectively, the chemistry laureates' discoveries cracked the protein code and enabled the design of new proteins, solving the long-standing "protein-folding problem."

Baker, of the University of Washington, pioneered methods to design proteins that do not exist in nature, unlocking potential for new pharmaceuticals, vaccines and nanomaterials. Hassabis and Jumper, of Google DeepMind, developed AlphaFold, an artificial intelligence model capable of predicting protein structures from amino acid sequences with unprecedented accuracy. This tool has revolutionized molecular biology by providing structures for nearly all known proteins.


BAKER

The trio's contributions will allow scientists to tackle 21st-century challenges such as antibiotic resistance and plastic degradation.


HASSIBIS

During the COVID-19 pandemic, Baker designed what he called "miniprotein inhibitors" to block the SARS-CoV-2 virus' interaction with its receptor, which are now in clinical trials. These innovations are transforming fields from medicine to biotechnology, marking a new era in protein science.


JUMPER

"I hope this recognition inspires the next generation to focus their efforts on both fundamental research and its translational applications," Conaway said.

Marissa Locke Rottinghaus (mlocke@asbmb.org) is the science writer for ASBMB.

Using a network to snare the cause of kidney disease

By Seema Nath

Proteins in their correct shapes are the building blocks of properly functioning bodies. When proteins misfold or unfold, they malfunction, leading to life-threatening diseases.

The zinc-binding protein leukocyte cell–derived chemotaxin-2, or LECT2, is synthesized in liver cells for secretion into the blood. When misfolded, it aggregates in the kidneys and liver, resulting in organ failure and end-stage kidney diseases. Accumulation of misfolded LECT2, called LECT2 amyloidosis, or ALECT2, is most common in Hispanic adults; it has no known biomarkers, and the only diagnosis option is a kidney biopsy.

In ALECT2 patients, both copies of the LECT2 gene harbor a mutation, which researchers think contributes to the disease. This mutation is common in the general population, however, leading researchers to believe that other physiological stressors act in concert with the mutation to cause ALECT2. Leading candidates for these stressors are loss of LECT2's bound zinc ion and flow shear as the protein travels through blood vessels.

To learn more about this relationship, Stewart N. Loh's team at the State University of New York Upstate Medical University and Dacheng Ren's lab at Syracuse University designed a microfluidic device to mimic blood flow through the human kidney. They recently published a paper about their work on the aggregation of LECT2 in kidney disease in the **Journal of Biological Chemistry**.

"We can do benchtop assays or go to animal models for biological studies," Ren said, "but none of those systems have real-time observation capabilities, and here the microfluidic device comes into play."

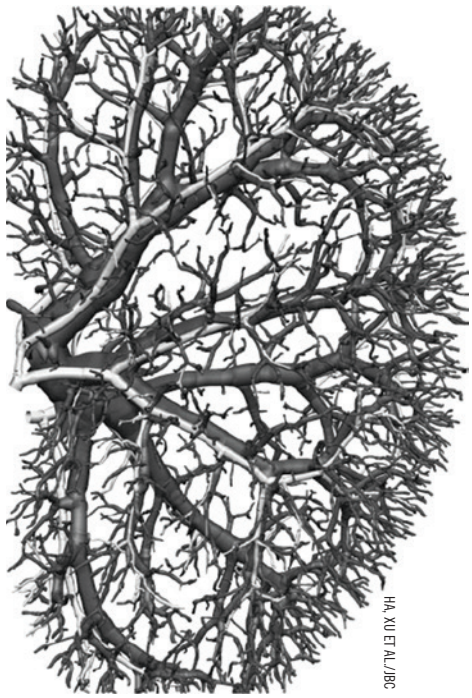
Ren's team created a microfluidic chip mimicking the blood capillaries in a kidney. The researchers individually pumped normal and mutant LECT2 proteins purified by Loh's team into the device at the physiological flow rate.

"Dr. Ren's lab recorded images in real time as the protein was aggregating at the smallest channels corresponding to the smallest dimensions of kidney that go into the glomerulus," Loh said, "and you could see the protein is clogging those channels going upstream, resembling what you see in kidney diseases."

The researchers calculated the density and percentage of aggregates clogging the channels at a specific time to compare how the normal and the mutant aggregates formed. They then used cryo-electron microscopy to observe the aggregates under stress.

The study showed for the first time two conditions that may combine to cause ALECT2 — the mutation along with loss of zinc ion and the kidney-like flow shear inducing ALECT2 in the absence of zinc.

"The next step will be adding serum albumin or changing the viscosity in a controlled way and finally using the whole blood or serum to study the actual system," Loh said.



H.A. XU ET AL./JBC

The device designed by the researchers mimics the branched vasculature of the human kidney to study protein aggregation.

"Our program is geared toward developing a biosensor and tools to detect these misfolded proteins in the blood before they have a chance to build up in the organ."

Ren said the microfluidic device could be used to study the real-time behavior of biomolecules in organisms and to diagnose other conditions caused by circulating misfolded proteins.

"The device could potentially be scaled up for high-throughput screening studies in the future," he said.

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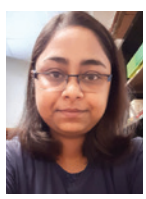

Can a hair-loss drug prevent heart disease?

By Arti Dumbrepatil

Drug discovery is costly and filled with uncertainty. Drug repurposing reduces time and costs by identifying new applications of a drug already approved or under investigation by the U.S. Food and Drug Administration. The FDA approved finasteride, under the brand name Proscar, in 1992 to treat benign prostate enlargement in men and again, in 1997, to treat male pattern hair loss.

Researchers at the University of Illinois Urbana–Champaign, or U of I, recently found another potential use for finasteride: preventing cardiovascular diseases, or CVDs. In a study published in the **Journal of Lipid Research**, the team hypothesized that finasteride may lower heart disease risk by cutting cholesterol levels.

The researchers studied the effects of finasteride on male mice and analyzed data from men who participated in the National Health and Nutrition Examination Survey, or NHANES, between 2009 and 2016.

Finasteride is a 5-alpha-reductase inhibitor that prevents the conversion of testosterone into dihydrotestosterone, or DHT, an active metabolite that plays a critical role in forming male sex organs, hair patterns and prostate growth.

Donald Molina, a graduate student at U of I and first author of the study, explained that low levels of testosterone in men are associated with higher CVD risk.

"As the drug acts on the levels of testosterone, we thought there might be an association between the drug and heart disease," he said. "This was our starting point; we investigated how finasteride affected lipid profiles in humans."

The team first analyzed the data deposited at NHANES and found that finasteride intake was associated with a reduction in total cholesterol and low-density cholesterol.

"These results encouraged us to go for the animal studies," Molina said.

The researchers used male mice genetically predisposed to atherosclerosis, a major underlying cause of heart disease. They fed the mice a high-fat, high-cholesterol diet for 12 weeks, and finasteride was administered in four increasing doses. They monitored cholesterol and other lipid levels and studied gene expression and lipid metabolome.

The mice on finasteride had lower cholesterol levels and showed delayed progression of atherosclerosis, reduced plasma triglycerides and less liver inflammation.

Jaume Amengual, an associate professor at U of I and lead author on the study, said the team thinks that, in the presence of finasteride, the liver degrades more lipids.

"The liver is burning more fat," Amengual said. "We can also relate our findings to fatty liver disease. When you have a bad diet, you have a lot of fat accumulating in your liver; your liver will become inflamed and eventually develop into liver cirrhosis and even cancer. In our experiment, finasteride appeared to cause a decrease in the fat content in the liver and a decrease in liver inflammation. Not only did finasteride reduce levels of plasma cholesterol; it also improved how the liver was working in these mice."

To bolster these findings, the researchers will need a detailed analysis of the effects of finasteride on a statistically relevant population, metabolic side effects, as well as studies of its interactions with other drugs that target cholesterol synthesis or absorption.

"One of the reasons why I became interested in this medication in the first place is because I have been taking this drug for hair loss since I was about 20," Amengual said. "Even with limitations, our study offers a steppingstone for repurposing finasteride for preventing cardiovascular diseases."

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Do ribosomal traffic jams cause Huntington's disease?

By Uzma Rentia

Huntington's disease, or HD, is inherited in an autosomal dominant manner. HD kills important neurons in the brain, causing uncontrollable movements and cognitive and psychiatric changes.

While scientists have long known that HD is caused by a cytosine–adenine–guanine trinucleotide repeat in the Huntingtin gene on chromosome 4, they are still studying the biological mechanisms that guide the disease. In particular, researchers have implicated mitochondrial dysfunction in the pathophysiology of HD.

Investigators at the Wertheim University of Florida Scripps Research Institute examined mitochondrial messenger RNA, or mRNA, translation in mice genetically predisposed to HD. They found that ribosomes — particles responsible for creating proteins from instructions encoded in mRNA — get clustered and jammed on mitochondrial mRNA transcripts. The team published these findings, in the journal **Molecular & Cellular Proteomics**.

Srinivasa Subramaniam, an associate professor at Wertheim UF Scripps, was the lead author on the study. "Imagine going from Baltimore to Washington, D.C., and there are too many cars, and they are all jammed up," he said. "Just because there are many cars does not mean they are all reaching their destination.

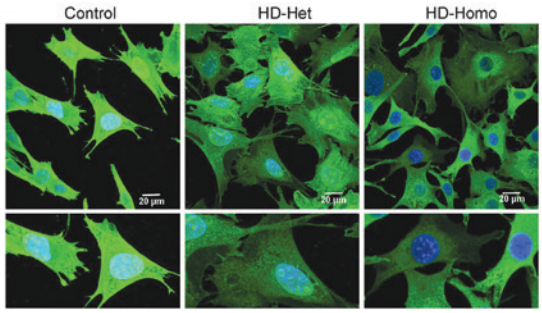
"So, what does that mean for the patient? That means that the patient may have difficulty translating their mitochondrial protein. And that may lead to problems in the assembly of these complexes, which may lead to problems in mitochondrial function."

This project followed Subramaniam's previous work, which showed high expression of fragile X messenger ribonucleoprotein, or FMRP, a protein that blocks ribosomes in HD. Consequently, he was curious to see the spatial distribution of ribosomes on mitochondrial mRNA, so Subramaniam turned to a technique called Ribo-Seq, which provides a snapshot of the location and density of ribosomes on a given mRNA transcript. He had no experience with the technique and immediately faced challenges.

"I am a biochemist by training," Subramaniam said. "So I needed to sit and write hundreds of emails like 'Can you help me?' all over the world."

He connected with collaborators in France and Ireland and took on a postdoc with Ribo-Seq experience. Almost four years later, Subramaniam's lab published the results of their work. And with these results come new questions.

Previous research has shown that deleting the FMRP protein can prevent some cognitive deficits observed in HD. Subramaniam wants to investigate how modulating the expression of FMRP can affect the spatial distribution of ribosomes on mRNA transcripts. He also wants to see how communication between the cytoplasm and mitochondria contributes to what he likens to a "traffic jam." He hypothesizes that the cytoplasm inhibits proper functioning of mitochondrial mRNA, creating confusion.



MCP

These mouse striatal cells have a normal genotype (left), are heterozygous (center) or homozygous (right) for a Huntington's disease mutation. Puromycin uptake is shown in green and represents the cellular protein translation rate. Nuclei are shown in blue.

"Imagine if you are traveling through a tunnel, and you close that tunnel," he said. "Who puts on that brake? Who triggered that pathway? What is the signal that makes this traffic jam? That is what I want to know in more detail at the molecular level."

He hopes this work has practical applications as well.

"How can we use small-molecule screening to reverse this phenotype?" he said. "My goal is to identify the mechanisms and then leverage potential therapeutics."

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From the journals

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

RNA and splicing affect cancer invasiveness

Tandem repeats in pericentromeric regions, such as those that make up the genetic locus human satellite II, or HSATII, can be aberrantly transcribed in cancers, such as epithelial and pancreatic cancer. Furthermore, genetic dysregulation in these cancer tissues often promotes double-stranded HSATII RNA, or dsHSATII. However, research has shown that double-stranded RNAs can both promote and suppress tumors. In addition, researchers do not yet know how dsHSATII affects tumor progression.

In their recent study in the **Journal of Biological Chemistry**, Takuma Iwata and colleagues at the University of Tokyo investigated the function of dsHSATII in pancreatic cancer. They found that dsHSATII RNA promotes mesenchymal-like morphological changes and enhances the invasiveness of pancreatic cancer cells. In addition, they identified an RNA-binding protein, spermatid perinuclear RNA-binding protein, or STRBP, that preferentially binds to dsHSATII over single-stranded HSATII. STRBP is also involved in the alternative splicing of genes associated with the epithelial–mesenchymal transition, or EMT. Using 3D cell cultures and xenograft models, the authors demonstrated that STRBP suppresses dsHSATII's role in EMT by altering the expression of CLSTN1, an EMT-associated gene that encodes for a transmembrane protein with activity as a cell adhesion molecule. An isoform of CLSTN1 is associated with metastasis and poor prognosis for certain types of cancer.

These results reveal that the novel dsHSATII–STRBP signaling axis regulates EMT in pancreatic cancer. Researchers will need to do more studies in the future to investigate the mechanistic details of this signaling axis and whether STRBP regulates additional genes or could be a novel therapeutic target.

DOI: 10.1016/j.jbc.2024.105742

— Ken Farabaugh

Detecting nitrotyrosine-containing proteins

Proteins and peptides undergo post-translational modifications, or PTMs, which can change their structure, function and cellular localization. One of these PTMs, the nitration of tyrosine, is irreversible. Nitrotyrosine-containing peptides and proteins are associated with inflammatory, neurodegenerative and cardiovascular disorders as well as cancer. These modified proteins and peptides are also oxidative stress markers. However, due to their low abundance, researchers cannot easily identify them using conventional lab techniques.

Recently, Firdous Bhat of the Mayo Clinic and an international team of researchers developed a technique to detect nitrotyrosine-containing proteins and peptides using four commercial monoclonal antibodies to enrich their abundance. They published their results in the journal **Molecular & Cellular Proteomics**.

The authors tested the technique in a multiple myeloma cell line and then analyzed the peptides using liquid chromatography–mass spectrometry. They identified more than 2,600 nitrotyrosine-containing peptides and proteins — the largest number containing nitrotyrosine identified to date. The authors synthesized and validated 101 novel peptides using a synthetic library and showed that 70% of their results were accurate. The researchers suggested that this method can be used to investigate the pathological implications behind nitrotyrosine-containing peptides and proteins in various diseases.

DOI: 10.1016/j.mcpro.2024.100733

— Krishnakoli Adhikary

Read more news from ASBMB journals here:

Ion channels and tumor aggressiveness

Ion channels emerged recently as key factors that control tumor characteristics, with growing evidence suggesting a correlation between tumor aggressiveness, or how fast a tumor can grow and spread, and various ion channel aberrations. Small conductance calcium-activated potassium, or SK channels, are expressed in different types of cancer cells. SK3 channels can promote cancer cell migration. However, scientists do not know how SK3 channels are regulated.

Do lipid levels influence mortality?

Alterations in plasma lipids, or dyslipidemia, are a major risk factor for heart disease and mortality. This condition is defined as elevated plasma cholesterol, low-density lipoprotein cholesterol, or LDL or triglycerides and low plasma high-density lipoprotein cholesterol, or HDL-C. Because researchers don't understand the relationship between lipid profiles and all-cause and cause-specific mortality, which define the number of deaths from any cause or from a specific cause, respectively, Jiawen Lu and Zhenqian Wang of Sun Yat-sen University and a group of researchers in China explored this association using a metanalysis.

In a recent article in the **Journal of Lipid Research**, the team conducted statistical tests on a population of 407,951 British individuals that probed the causal relationship between type of mortality and lipid levels. Of this population, 45.9% had cause-specific mortality. They examined the association of mortality with six traits: LDL-C, HDL-C, triglycerides, apolipoprotein A1, or ApoA1, apolipoprotein B, or ApoB, and lipoprotein(a), or Lp(a). The authors showed that individuals with high levels of ApoA1 are at decreased risk of all-cause mortality. In the case of cause-specific mortality, individuals with high

ApoA1 levels are at decreased risk of cancer-related mortality. Furthermore, they showed that individuals with low Lp(a) levels have an increased risk of cardiovascular disease, or CVD–related, and digestive disease–related mortality. Finally, they found that ApoB levels are positively correlated with CVD-related and neurodegenerative disease–related mortality, while individuals with high levels of LDL-C are at increased risk of CVD-related mortality and decreased risk of neurodegenerative disease–related mortality.

These findings suggest that elevated ApoA1 levels and low Lp(a) levels may attenuate an individual's risk of cancer and digestive disease–related death. Furthermore, modulating specific plasma lipid levels to mitigate risk may open a new avenue of personalized treatment.

DOI: 10.1016/j.jlr.2024.100528

—Swarnali Roy

In a recent study in the **Journal of Lipid Research**, Marion Papin, Delphine Fontaine and their team at the University of Tours, France, defined how endogenous ether lipids, or ELs, regulate SK3 channels. Within membranes, ELs can form alkyl phospholipids, if the ether bond is saturated, or alkenyl phospholipids, with a vinyl-ether bond. The authors found that suppressing two key enzymes in EL synthesis, alkylglycerone phosphate synthase or plasmanylethanolamine desaturase 1, decreased SK3 expression. Mechanistically, this suppression drove the expression of two microRNAs, which decreased cancer cell SK3-dependent calcium entry cell migration as well as cell adhesion and invasion.

These data suggest that the composition of alkyl- or alkenyl-ELs could be used to manipulate SK3 channels to control cancer cell aggression. Future research is needed to examine the role of SK3 channels in neurodegenerative and cardiovascular diseases, which both feature reduced ether lipids levels.

DOI: 10.1016/j.jlr.2024.100544

—Carmen Morcelle

How a fungal pore protein assembles

The fungus Candida albicans is a common commensal resident of the human gut. Upon gut microbiota imbalance or immune system suppression, C. albicans can undergo a morphological transition to an invasive form that causes the infection candidiasis. In this invasive form, C. albicans expresses a pore-forming peptide called candidalysin that wreaks havoc on the host's epithelial cell membranes. Finding a way to disrupt candidalysin may provide an avenue for selectively treating candidiasis without using broad-spectrum antifungals, which can harm beneficial gut microbes.

To form an active pore, candidalysin first polymerizes in solution, but scientists do not fully understand this mechanism. So, Katherine Schaefer,

Boomer Russell and colleagues at the University of Missouri and the University of Tennessee used biophysical tools to clarify this process in a recent publication in the **Journal of Biological Chemistry**. They identified four events that occur when the peptide polymerizes. First, the monomer peptide oligomerizes to form octamers that then join to make a longer chain. Three different events proceed from this chain: chain extension, chain branching and cyclization, which forms the destructive pore.

Additional studies will elucidate what conditions stabilize the cyclized polymer. These results may help researchers identify ways to dismantle candidalysin assembly to protect host cell membranes and specifically target C. albicans infection.

DOI: 10.1016/j.jbc.2024.107370

—Emily Ulrich

Sphingolipid mutations drive cognitive impairments

Sphingolipids are a major class of lipids that are enriched in the nervous system. They serve as membrane constituents and signaling molecules and play crucial roles in neuronal development and function. Alterations in sphingolipid levels and metabolism have been linked to neurological disorders such as Alzheimer's and Parkinson's disease, making them a candidate target for therapeutic intervention.

In a recent study in the **Journal of Lipid Research**, Michele Dei Cas and colleagues at the Università degli Studi di Milano dissected the mechanism behind pathogenic mutations of sphingolipid delta-4-desaturase, or DEGS1, an enzyme in the ceramide synthesis pathway. Patients with these mutations have neurodevelopmental disorders characterized by reduced myelin deposits in the central nervous system, which can cause severe neuromotor and cognitive impairments as well as early mortality.

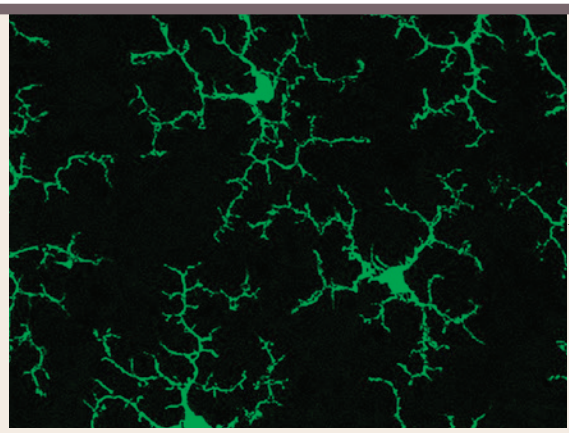
The authors showed that the DEGS1 mutations cause low protein expression. In addition, they found that the DEGS1 mutant proteins had impaired catalytic function. The group concluded that both loss of function and reduced protein levels

Microglia EVs: Biomarkers for neuronal diseases

Microglia are vital immune cells of the central nervous system that mediate neuroinflammatory responses through the secretion of extracellular vesicles, or EVs. Although previous studies showed the significance of microglia-derived EVs in neurological diseases with unique proteomics profiles, scientists still do not understand the impact of different microglial activation states on neuroinflammation.

In a recent article published in the journal **Molecular & Cellular Proteomics**, Juliet Santiago and a team of researchers at Emory University described how they examined a mouse-derived microglial cell line, BV2, and BV2-derived EVs in different conditions. They used LPS to polarize BV2 cells to a proinflammatory state and IL-10 and TGFB to polarize BV2 cells to protective and homeostatic states, respectively. Using size exclusion chromatography, the authors purified the EVs released by the BV2 microglia. In addition, they used label-free quantitative mass spectrometry and RNA sequencing to characterize and analyze the proteomic and transcriptomic profiles of microglia-derived EVs.

The authors identified both classic and novel EV proteins, including cytoskeletal proteins, heat shock proteins, integrins and tetraspanins along with messenger RNAs and microRNAs associated with distinct



WAI T. WONG/NATIONAL EYE INSTITUTE, NIH

Microglia in the retina of a healthy adult mouse.

microglial activation states. LPS treatment of BV2 microglia most dramatically altered both the transcriptomic and proteomic profiles of the microglia-derived EVs compared to other treatments. Specifically, LPS increased mRNA transport to the EVs.

These findings suggest that BV2 microglial polarization affects EV cargo, potentially contributing to inflammation in neurodegenerative diseases. Therefore, EV cargo may serve as biomarkers and pave the way for studying the mechanisms by which microglia-derived EV cargo contributes to disease progression.

DOI: 10.1016/j.mcpro.2023.100678

—Vashnika Patel

are relevant in disease pathogenesis and asserted that these results could be useful for future characterizations of novel DEGS1 variants.
DOI: 10.1016/j.jlr.2024.100517

— Carmen Morcelle

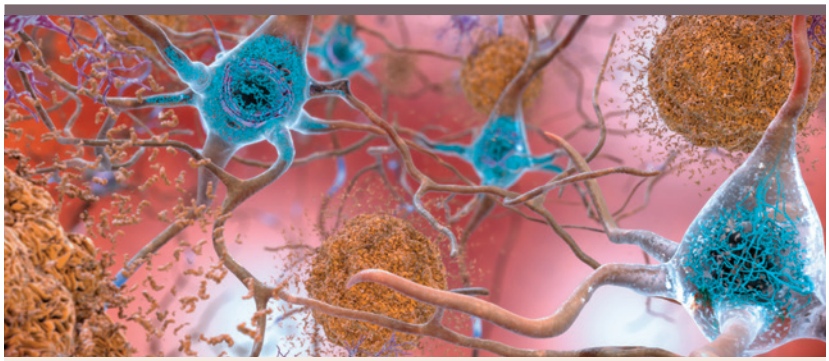
Analyzing yeast proteasomes

In eukaryotic cells, proteasomes break down misfolded and damaged proteins. The proteasome is made up of core proteolytic subunits that degrade peptides as well as regulatory subunits. Fluctuations in proteasome levels can disrupt protein homeostasis and lead to diseases, such as Alzheimer's disease, Huntington's disease, cystic fibrosis and others.

In a study published in **Molecular & Cellular Proteomics**, Manisha Priyadarsini Sahoo, Tali Lavy and a team from the Technion–Israel Institute of Technology investigated proteasome activity in normal and mutant yeast strains lacking the proteasome integral subunits Sem1 and α3. They used activity-guided proteomic profiling to isolate and analyze active proteasome complexes. In this method, the researchers used a fluorogenic peptide substrate of the proteasome as an indicator to select the active proteasome complexes for analysis. They found that the mutant strains exhibited reduced proteasome activity, attributed to increased binding of Fub1, a proteasome inhibitor, and incomplete maturation of the β2 and β5 proteolytic subunits.

These immature subunits may be important mediators of proteasome quality control. Future studies will investigate the role of other immature proteasome subunits and their potential binding partners; this could inform how to treat disorders associated with aberrant proteasome expression or function.
DOI: 10.1016/j.mcpro.2024.100728

— Krishnakoli Adhikary



NATIONAL INSTITUTE ON AGING, NIH

In Alzheimer's disease, increased levels of the β-amyloid protein clump together to form plaques (seen in brown) that collect between neurons and disrupt cell function.

Alzheimer's disease neuronal traffic jam

Alzheimer's disease, or AD, is the most common type of dementia in the U.S. and is characterized by progressive memory loss. It is caused by the aggregation of abnormal, pathogenic beta-amyloid, or Aβ, and tau proteins. After cleavage of the Aβ precursor, β-amyloid precursor protein, or APP, Aβ aggregates in the brain and forms plaques, which are hallmarks of AD.

The human brain contains billions of neurons, responsible for sending signals throughout the body. Neurons have long extensions called axons, which transport cargo such as proteins, RNA and organelles. The axons serve as the cellular network of highways, shuttling cargo back and forth using cellular vehicles called motor proteins, including dynein. Prior studies suggest that axonal transport is disrupted in AD. However, scientists know little about the mechanisms behind impaired transport, and how it affects disease progression.

In a recent study in the **Journal of Biological Chemistry**, Monica Feole of Masaryk University in the Czech Republic and an international team studied a rare mutation in APP, isolated from a Swedish familial AD cohort, to examine if the mutant affects axonal transport and disease pathology. They transfected mature human neurons with either normal APP or Swedish variant APP and tracked their axonal transport. The team found that the Swedish variant APP transport stalled for longer intervals and favored movement toward the neuron's cell body compared to the normal APP, which is often located at the axon terminals. They further showed that the Swedish variant APP has an increased binding affinity for dynactin, a protein that activates the dynein motor, which promotes transport back to the cell body. Further, the researchers discovered that the Swedish variant flips the transport direction of organelles such as endosomes and lysosomes along the axons, which leads to enlarged endosomal accumulation in the axons.

This study broadens the knowledge of how cellular highways, or axons, get clogged in AD and their role in disease progression. Further research is needed to assess if interventions in the axonal transport pathway may be able to alleviate AD.
DOI: 10.1016/j.jbc.2024.107137

— Ankita Arora

From receptor research to cancer drug development: The impact of RTKs

By Arti Dumbrepatil

When Joseph Schlessinger was a grad student at the Weizmann Institute of Science in Israel, he was interested in biophysics.

"Then I realized that I wanted to study cells," Schlessinger said, "so I did a postdoc at Cornell in the laboratories of Elliot Elson and the late Watt Webb where fluorescence correlation spectroscopy and photobleaching applications were developed to study receptor diffusion on cell membranes."

As he began to read about receptors, he found he was more interested in their biology than studying their motion.

"You can see, everything was sort of a relatively short-term plan, which turned out to be very productive in a way," said Schlessinger, who now studies tyrosine phosphorylation, a mechanism for signal transduction in cells, and develops therapeutic drugs antagonizing the activity of tyrosine kinases in cancer and other diseases.

After stints at the Weizmann Institute and New York University, Schlessinger joined the faculty at Yale University School of Medicine in 2001.

Schlessinger's lab discovered how receptor tyrosine kinases, or RTKs, are activated by dimerization and how they regulate cellular processes.

The lab's studies provided the foundation to target cancer therapies against RTKs and downstream signaling intermediates, leading to the development of new cancer drugs.

Biotech companies founded by Schlessinger and collaborators have developed four Food and Drug Administration–approved cancer drugs among the 50 kinase inhibitors the lab developed for clinical use in treating cancer.

"In life, do not have a plan — just have fun learning new things," Schlessinger said. "Throughout my career, I was just having fun with experiments. I think this makes it much more beautiful. I always go where the science takes me.

For his work, the American Society for Biochemistry and Molecular Biology will present Schlessinger with the 2025 ASBMB Herbert Tabor Research Award for outstanding, innovative accomplishments in biological chemistry and molecular biology and contributions to the community of scientists.

JOSEPH SCHLESSINGER

Turning new cancer targets into drugs

Cancer cells can evade cell death signals. Cell communication involves signaling pathways and membrane receptors. Receptor tyrosine kinases, or RTKs, identified as transmembrane receptors for insulin and epidermal growth factor, promote cell survival and signaling. When genetic mutations or overexpression dysregulate protein tyrosine phosphatase activity, cancer develops.

As a result of this oncogenic addiction, receptors have become critical targets for several cancer therapeutics.

Joseph Schlessinger's lab studies the transmembrane receptor family known as the RTKs.

"For the last 40 years, we have done everything possible to understand the mechanism of action of these receptors," Schlessinger said.

Blocking RTK activation is a major strategy in developing anticancer drugs. Schlessinger and colleagues formed Sugen Inc. in 1991 and Plexxikon in 2001. Sugen's drug Sutent for kidney and stomach cancers was approved by the FDA in 2006.

An experimental compound, PLX4032 by Plexxikon in partnership with Roche, is in clinical trials to compare its safety and effectiveness against the current standard treatment for melanoma and to find the highest dose that can be administered for colorectal cancer without causing severe side effects.

Arti Dumbrepatil (artidumbre@gmail.com) is a freelance science writer and communicator who transforms complex, jargon-filled science into enjoyable and comprehensible content. She is an ASBMB Today volunteer contributor.

Computational biosciences illuminate how molecular condensates form

By Jay Thakkar

When Rohit Pappu was a postdoctoral fellow at Johns Hopkins University working on protein folding, he had a conversation with Keith Dunker, a pioneer in the field of intrinsically disordered proteins, or IDPs. Dunker then shared a paper with him.

"I read that through the night," Pappu said.

He realized that there might be a different way to think about IDPs — not just from a sequence analysis perspective, but also from a biophysical point of view.

After he set up his own lab at Washington University in St. Louis, Pappu started working on IDPs by combining atomistic and coarse-grained simulations with polymer physics principles to develop models that quantitatively describe their sequence–ensemble relationships.

The work in his lab has led to development of computational engines such as CAMPARI, LaSSI and CIDER. These are used to generate insights regarding the conformational ensembles (CAMPARI), phase behaviors (LaSSI) and compositional biases as well as non-random sequence features of IDPs (CIDER). Insights and results from biophysical and informatics computations enable quantitative predictions that are testable using experiments, making these tools useful for the IDP and phase separation community and for noncomputational scientists.

Over the past two decades, Pappu's work has been at the cornerstone of understanding function and phase behaviors of IDPs, and he will receive the American Society for Biochemistry and Molecular Biology's 2025 DeLano Award for Computational Biosciences. Tanja Mittag and Alex Holehouse nominated Pappu for the award.

"The generality of conclusions borne from LaSSI simulations is a testament to the creativity of Prof. Pappu's research program," Mittag and Holehouse wrote in their nomination letter. "(T)he conceptual and computational ecosystem Prof. Pappu has developed over the course of his career has had a profound impact on the field of IDPs and biological phase separation."

ROHIT PAPPU

Decoding phases

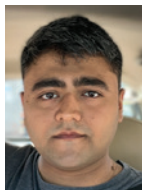
Cells consist of compartments with distinct functions. However, some compartments lack a membrane, and they form reversibly via phase separation. Phase separation, which is driven by the poor solubility of macromolecules and the associations afforded by multivalent interactions, enables specific molecules to concentrate into specific localities within a cell. The bodies that form as the result of phase separation are known as biomolecular condensates.

In his studies, Pappu tries to predict and model the phase behaviors of biomolecules that include IDPs, nucleic acids and proteins that feature disordered regions and folded domains. This research also focuses on understanding the driving forces behind the formation of condensates. The foundational studies of what determines how condensates form have a direct impact on understanding how condensates contribute to neurodegenerative diseases and cancers.

Pappu's computational approaches provide a platform for understanding how physical chemistry principles contribute to cellular localization and the makeup of condensates. These approaches, combined with experiments, help us better understand the microenvironments and players involved in creating molecular condensates.

Rohit Pappu will give a talk titled "Phase separation in cells: Insights from biophysical computations" at the 2025 ASBMB Annual Meeting, April 12–15 in Chicago.

Jay Thakkar (jayt683@gmail.com) is a researcher specializing in computer-aided drug design and discovery and holds a master's degree in chemistry from the Stevens Institute of Technology. He is an ASBMB Today volunteer contributor.



Integrating sex as an essential variable

By Poornima Sankar

Nicole C. Woitowich's career as a scientist and advocate has been guided by a central principle: "To be a leader means to really empower all of the people you work with."

As a graduate student at Rosalind Franklin University of Medicine and Science, Woitowich helped develop an outreach program, Women in Scientific Discovery or Medicine, or WISDOM, to encourage young girls to pursue science careers. In 2016, she was selected for the Presidential Management Fellowship, a federal leadership program. Rather than pursuing a government role, she chose a career combining research, advocacy, policy and science communication.

During her graduate training, working on reproductive physiology and enzymology, Woitowich noticed the often-overlooked importance of sex differences, particularly the role of hormones in whole-body systems.

Reflecting on her training, she said, "I was taught to think about sex differences, so it felt natural to me. I didn't realize others weren't considering it."

Woitowich is the executive director of the Northwestern University Clinical and Translational Sciences Institute and a research assistant professor in the department of medical social sciences. Her work focuses on advancing gender equity in science, emphasizing the importance of incorporating sex as a biological variable in biomedical research. She points to the lack of dedicated funding to address sex differences in research and highlights the efficiency of designing studies that consider sex as a critical variable from the outset.

"If we can design experiments to consider sex as we would time, dose and reagents, we save time and resources by improving rigor and reproducibility," she said.

Her commitment to interdisciplinary science is also evident in her role as executive director of a Clinical and Translational Science Award, or CTSA, hub.

"I'm not limited to one area of science," Woitowich said. "In this role, I have the unique opportunity to engage with researchers across diverse fields, fostering collaborations that push scientific discoveries closer to real-world applications. My career allows me to support and amplify the work of others, helping to bridge gaps in knowledge and bring transformative innovations to patients and communities faster."

She serves on the American Society for Biochemistry and Molecular Biology Finance Committee and directs the Women's Health Access Matters, or WHAM, Research Collaborative, a nonprofit dedicated to improving women's health research.

Woitowich is the 2025 recipient of the ASBMB Emerging Leadership Award, which honors an associate professor, assistant professor or equivalent with no more than 15 years of experience since receiving a Ph.D. and/or M.D.

NICOLE WOITOWICH

Ask different questions

Nicole Woitowich is a science communicator. She has served as chair of the American Society for Biochemistry and Molecular Biology Science Outreach and Communication Committee, where she spearheaded updates to the Art of Science Communication course.

She is also a proponent for advancing women in science and medicine and believes that a more diverse scientific workforce will lead inherently to greater attention to sex-based data.

"Women ask different research questions because they understand how certain factors affect them uniquely," she said. "This diversity of questions, perspectives and thought improves the quality of science."

Woitowich's work ranges from analyzing sex and gender bias in research and contributing to academic writing to serving as a university administrator and science communicator.

She describes her career as "challenging, but ... incredibly rewarding and fulfilling."

Poornima Sankar (sankarp@amc.edu) is a graduate student at Albany Medical Center studying the immunology of tuberculosis. She is an ASBMB Today volunteer contributor.

Beyond the bench: On a mission to build an inclusive scientific community

By Jessica Desamero

Benjamin Garcia was a late bloomer in science. His parents are from Mexico, and he was born and raised in Southern California as a self-proclaimed "slightly above average student." It wasn't until midway through college that he became interested in chemistry.

As an undergraduate, Garcia started working in a laboratory, which opened his eyes to scientific research. In 2005, he earned a Ph.D. in chemistry from the University of Virginia.

Garcia is now a professor and head of the biochemistry and molecular biophysics department at Washington University School of Medicine in St. Louis. His research uses quantitative mass spectrometry–based proteomics to characterize modified proteins and proteomes, especially those involved in epigenetic mechanisms.

The American Society for Biochemistry and Molecular Biology selected Garcia to receive the ASBMB Ruth Kirschstein Diversity in Science Award in recognition of his commitment to breaking down barriers against scientists and students in historically marginalized or excluded groups.

Garcia's resolve to increase diversity stems from a past lack of representation. As a student, he never had a science course taught by a Hispanic professor and didn't see many underrepresented scientists in research.

"You start thinking, 'Is this where I should be? Am I welcome in science? Do people want me here?'" he said.

Great mentors and organizations helped him overcome his imposter syndrome. One memorable moment was attending a poster session hosted by the Society for Advancement of Chicanos/Hispanics and Native Americans in Science, or SACNAS, and seeing so many Hispanic scientists at once.

"That was incredibly motivating to know there are scientists out there that looked like me," he said.

Once Garcia became established, he felt it was time to give back and help others.

"It's all about helping the next generation move forward," he said.

At Washington University, Garcia started a summer undergraduate research program that favors students who have no research experience and has hosted a number of underrepresented minority students. He also convinced faculty to participate in workshops to help better understand and support trainees of diverse backgrounds.

Recently, Garcia also helped start a mass spectrometry special interest group for Hispanic and Latinx scientists. He has arranged for students and faculty to attend SACNAS conferences, given motivating talks at institutions and recommended policy changes to address systemic racism. Since 2022, Garcia has been a mentor for ASBMB's Maximizing Opportunities for Scientific and Academic Independent Careers, or MOSAIC, program, for postdoctoral researchers from diverse backgrounds.

In a letter nominating Garcia for the Kirschstein award, his first Ph.D. student, Mariana Torrente, now a professor, wrote, "I strive to give my students the same type of approachable, comprehensive mentoring that he exemplifies. His efforts have made a world of difference to me and the many others that came after me."

A journey to find his place

At the 2025 ASBMB Annual Meeting, April 12–15 in Chicago, Garcia will recount his journey from knowing nothing about science to heading a department at a top-ranked U.S. school of medicine.

He will describe how chance encounters and helpful mentors and advocates throughout his life helped get him to where he is today.

"No one could have predicted I would make it this far in science or academia," he said. "I shouldn't be here, but I am because of generous encouraging scientists who saw a glimmer of something special in me when I didn't see that for myself."

BENJAMIN GARCIA

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 science outreach organizations. She is an ASBMB Today volunteer contributor.

Empowering students with scientific service learning

By Elisabeth Marnik

In Neena Grover's very first nucleic acid course, she needed to teach them about HIV. To bring the subject to life, she had the class volunteer at the Southern Colorado AIDS Project. There, the students met people affected by the virus and saw what it means to live with, and sometimes die from, AIDS.

"Students want to learn in ways that connect what they're learning to something meaningful," Grover said. "That's the hook of this type of learning."

Starting with that first class, she has used innovative approaches in her classroom, combining discussions, research, problem-based learning and service learning.

Grover discovered her love for teaching and education during her postdoc when she taught organic biochemistry for the first time. Despite being told by others that teaching was a waste of time, she quickly realized she had been misinformed.

"The students were so enthusiastic and willing to learn," Grover said. "I realized that we don't take education seriously. We think it is something beneath us.

"That moment changed me. I thought I'd make more contributions to education than I would ever make to RNA."

Grover is a professor of chemistry and biochemistry at Colorado College and the recipient of the American Society for Biochemistry and Molecular Biology's 2025 William C. Rose Award for Exemplary Contributions to Education.

Grover has been an ASBMB member for more than 20 years, during which time she has shown a strong commitment to education. She has served on the Education and Professional Development Committee, helped establish the first ASBMB student chapters and led national ASBMB sessions on diversity, inclusion and antiracist practices.

In their nomination letter, Murphy Brasuel and Marilee Benore wrote that Grover "instills learning that stays with students. Alumni remark about their growth into competent and confident researchers and professionals and actively point to Neena's classes as a catalyst."

"Science does not exist in a vacuum in a lab," Grover said. "It exists in the discipline as the problems the society needs to solve or the conversations that society needs to have. Science must engage with the society in meaningful ways."

NEENA GROVER

Collaboration is essential

At the ASBMB 2025 Annual Meeting, Neena Grover plans to talk about the importance of embracing collaborations. She said she recognizes how much collaboration — with her colleagues, the community and her students — has impacted her work.

"You can't work in isolation," Grover said. "You can't work in a corner, and you can't do it without getting feedback. Building that network takes time. It takes energy. You may not see where it'll go, but it pays off in the end."

Grover plans to share examples of how collaborations make a difference.

"We need to especially embrace collaborations with students because they teach us how to teach them," Grover said. "We can't just view them as passive acceptors of knowledge. Each generation of students may learn differently. I must be open to where they are."

Elisabeth Adkins Marnik (emarnik@mdibl.org) is the science education and outreach coordinator at the MDI Biological Laboratory in Bar Harbor, Maine, where she is spearheading the development of new programming. She is an ASBMB Today volunteer contributor as well as a contributing writer to Those Nerdy Girls and The Global Autoimmune Institute.

Curiosity turned a dietitian into a lipid scientist

By Anna Crysler

Judy Storch began her career as a clinical dietitian. "I was always interested in food and nutrition," she said, "but realized that I wanted to understand the scientific underpinnings of what I was telling people to eat."

Eager to learn more about the science behind her nutrition advice, she pursued a master's degree. What began as curiosity morphed into a love for bench work and a path to a career in lipid research.

Now a distinguished professor of nutritional sciences at Rutgers University, Storch enjoys discussing research with her lab members and reading papers about new findings.

"What you see in the textbook is already interesting," she said, "but fundamental new discoveries are really exciting."

Storch's work shows that lipid-binding proteins are multifunctional. "They do more than just bind a lipid," she said. "They are also important as regulatory molecules and for communication within the cell."

She is a self-proclaimed reductionist, which drives her passion for understanding protein structure and lipid–protein interactions on multiple levels.

"In my lab, we look at things at the molecular level, the cellular level and the whole-animal level," she said. "By putting all this together, we try to get a picture of what these proteins are doing within cells."

Storch said she owes her success to support and excellent mentorship during her training years and as a faculty member.

"I had people who took me seriously as a scientist, and that wasn't necessarily true for women in labs at the time," she said.

Looking back, she is grateful for her mentors' and colleagues' encouragement and values this for her own trainees.

For her work, Storch will receive the American Society for Biochemistry and Molecular Biology's Avanti Award in Lipids, which recognizes outstanding research contributions in the area of lipids, at the 2025 ASBMB Annual Meeting, April 12–15 in Chicago.

Storch was surprised to hear she won the award.

"I'm closer to the end of my career than the beginning," she said, "but it's nice for my lab to have this recognition that the work that we're doing is of interest to people."

JUDY STORCH

New ways to look at lipid-binding proteins

Intracellular lipid-binding proteins, or LBPs, play an important role in gene regulation, signal transduction and metabolism. Two important types of LBPs are fatty acid binding proteins, or FABPs, and Neimann Pick C2, or NPC2, a cholesterol-binding protein. Researchers cannot completely understand the physiological functions of these proteins using standard biophysical methods, so they need to use transdisciplinary approaches.

Storch's lab developed novel techniques to study these functions, helping to elucidate lipid binding and transport kinetics as well as membrane–protein interactions. Using these methods, the lab found that different FABPs have dramatically different ligand transfer mechanisms.

George Carman, a Journal of Lipid Research associate editor who nominated Storch for the award, wrote in his nomination letter, "This finding focused the field on the fact that the different FABPs are likely to have different functions, despite their common fatty acid–binding property."

Through her strategies to understand NPC2-regulated cholesterol transport, Storch also identified a potential therapeutic approach to treat Neimann Pick C, a neurodegenerative storage disorder.

Storch will share the details of her lab's work on FABPs and NPC2 at the 2025 ASBMB Annual Meeting.

Anna Crysler (acrysler@seas.upenn.edu) holds a B.A. in biochemistry from Albion College and is a Ph.D. student in bioengineering at the University of Pennsylvania. She is an ASBMB volunteer contributor.

Elucidating how chemotherapy induces neurotoxicity

By Andrea Lius

As a child, Andre Nussenzweig did everything he could to avoid going into science. Both his parents were scientists, and so were many of his relatives. He really wanted to do something different, and his favorite activity was basketball.

"I'm still obsessed with the sports," Nussenzweig said. "But then I realized that becoming a professional basketball player wasn't in the cards, so I should find something else."

Nussenzweig explored philosophy, business and the social sciences before deciding to major in physics in college. He trained as a physicist in his Ph.D. program at Yale, and then in his first postdoctoral fellowship in Paris.

"Science is more me," he said. "But it still has a competitive edge, so in a way there are some interesting parallels with sports."

Nussenzweig said he found it challenging to make advances in physics because so much was already known. In biology, however, scientists' predictions often don't come true. And while unexpected results are sometimes disappointing, they make room for new discoveries.

"Physics didn't have the same excitement that I saw in biology," he said.

At first, Nussenzweig considered switching to structural biology. Many physicists who wanted to transition into biology chose this path, he said, because there is some overlap between the two.

But, the plan didn't end up working for him. He started taking courses in molecular biology and really enjoyed it. So, he did another postdoctoral fellowship at Memorial Sloan Kettering Cancer Center for some hands-on experience, then joined the National Institutes of Health in 1998 where he started his own lab.

"The key thing is to be really honest with yourself, see what you enjoy and be fearless about pursuing it, whatever it is," Nussenzweig said.

"Even if your background and your training aren't great fits for the role," he added. "Because you'll just learn it as you go."

Nussenzweig will receive the 2025 Bert and Natalie Vallee Award in Biomedical Science, which the American Society for Biochemistry and Molecular Biology presents to an established scientist for outstanding accomplishments in basic biomedical research. His lab studies how DNA damage arises in cancer, as well as in noncancerous, nondividing cells such as neurons.

ANDRE NUSSENZWEIG

A detour from heat shock to DNA repair

Andre Nussenzweig stumbled on the study of DNA damage and repair serendipitously during his postdoc at Memorial Sloan Kettering Cancer Center when his team was working on a project they thought was related to heat-shock proteins. Nussenzweig had generated a knockout mouse for a protein he believed was implicated in the heat-shock response.

"It turned out that gene had nothing to do with heat-shock," he said. "Instead, it was involved in DNA repair."

Nussenzweig also studies chemotherapies, which purposely induce DNA damage. Specifically, his lab has been looking into the neurotoxic side effects. Although chemotherapy is constantly improving, he said, patients often end up with persistent neurological symptoms and cognitive impairment. Nussenzweig's team is interested in understanding how different kinds of chemotherapy cause neuron loss or toxicity and how to prevent it.

"This is a really big problem in the field," he said, "and not many people have worked on understanding mechanisms by which chemotherapy induces neurotoxicity."

Andre Nussenzweig will present a talk titled "Maintaining genome stability" at the 2025 ASBMB Annual Meeting, April 12–15 in Chicago.

Andrea Lius (alius@uw.edu) is a Ph.D. candidate in the Ong quantitative biology lab at the University of Washington. She is an ASBMB Today volunteer contributor.

What seems dead may not be dead

By Anna Hu

In 2019, Vincent Tagliabracci received an email from a French bioinformatician alerting him to a similarity between part of the replication complex of the SARS coronavirus — which had caused an outbreak in the early 2000s — and a protein Tagliabracci had been working on.

Tagliabracci, an associate professor in the molecular biology department at the University of Texas Southwestern, wrote back that he wasn't interested in working on coronaviruses.

Then, 2020 came.

Tagliabracci's lab is known for studying human protein kinases, but during the COVID-19 pandemic, he switched gears, initiating a project with SARS-CoV-2 proteins that turned out to be involved in capping the viral RNA. One of these proteins, nonstructural protein 12, has a pseudokinase domain similar to selenoprotein-O, which Tagliabracci's lab had previously uncovered as an adenosine monophosphate–transferring kinase. It seemed like a good place to start.

They discovered how the cap is made in coronaviruses and showed that it is essential for viral replication. The team is now working with collaborators to identify small-molecule drug targets as another way to treat COVID-19.

The involvement of these proteins in creating a core cap structure highlights a new role pseudokinases can play, Tagliabracci said. The traditional theory is that pseudokinases are catalytically inactive because they don't transfer phosphate, but his lab's work suggests possibilities beyond this one reaction.

"Probably the biggest thing that we've done is made people start thinking more about alternative reactions that kinases can perform," Tagliabracci said. "And we've provided several examples showing that just because enzymes are predicted to be inactive, it doesn't mean they truly are."

Tagliabracci will receive the 2025 Earl and Thressa Stadtman Distinguished Scientist Award for outstanding achievement in basic research in the fields encompassed by ASBMB at the ASBMB Annual Meeting, April 12–15 in Chicago.

VINCENT TAGLIABRACCI

Expanding what we know about the kinome

A conference in Warsaw, Poland, jump-started Tagliabracci's interest in bioinformatics. By pairing bioinformatics hypothesis generation with exploratory wet lab work, his lab could more efficiently study the kinome, the set of protein kinases in a given organism. One big focus has been pseudokinases.

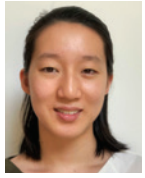
"What we've been finding is that they're only inactive when you try to measure phosphorylation," he said. "Some of them are doing completely different reactions."

Take selenoprotein-O, which contains the cysteine analog and 21st amino acid known as selenocysteine. By looking at its crystal structure, a postdoc found that adenosine triphosphate, or ATP, was flipped 180 degrees in the active site, meaning that adenosine monophosphate, or AMP, would be transferred instead of phosphate. This pseudokinase, which was predicted to be inactive, in fact transfers AMP from ATP to serine, threonine and tyrosine residues on proteins, helping cells regulate oxidative stress.

The process is now called AMPylation, but back in the 1960s when Earl Stadtman was conducting his research it was called adenylylation — and he's the one who identified this process in glutamine synthase. Meanwhile, none other than Thressa Campbell Stadtman first discovered selenocysteine in 1974.

"That was really the first example of an enzyme with a protein kinase fold that did a reaction other than phosphorylation," Tagliabracci said. "In hindsight, it would have been the perfect protein for Earl and Thressa to collaborate on."

Anna Hu (ahu4@wellesley.edu) earned her bachelor's degree in biochemistry from Wellesley College and is now a research assistant at the Harvard School of Public Health. She is an ASBMB Today volunteer contributor.



'You can't afford to be 15 years behind the parasite'

By Ankita Arora

As an undergraduate at Adelaide University in South Australia, David Fidock became interested in genetically engineering plants to make them resilient in increasing salinity and drought.

He wanted to do a Ph.D. focused on applying molecular biology techniques to improve health outcomes in the global south due to deteriorating climate conditions. So, he started applying for graduate positions in France and interviewed at several institutions.

His meeting with Pierre Druilhe, a physician–scientist at the Pasteur Institute in Paris, changed his life course.

Fidock was inspired by Druilhe's work on a vaccine that would prevent malaria infection by targeting the parasite before it enters the host's bloodstream.

"From a values perspective, malarial work fits the same criteria as crop science — addressing global health needs through the application of molecular biology and experimental research," Fidock said. "So, I decided to join his lab and contribute to malaria research instead."

Margaret A. Phillips nominated Fidock for the American Society for Biochemistry and Molecular Biology's 2025 Alice and C.C. Wang Award in Molecular Parasitology.

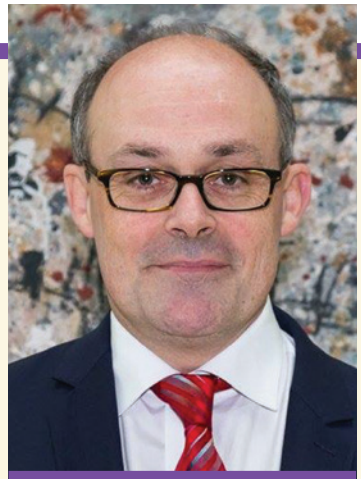
"Drug resistance has been a major contributor to our inability to control malaria on a global level," Phillips wrote in her nomination letter, "and David's work has had a major impact on our understanding of how drug resistance develops."

Fidock is a professor at Columbia University and a member of the World Health Organization's Malaria Policy Advisory Group, which advises the Global Malaria Programme on its efforts to control and eliminate malaria, including a focus on combatting drug resistance.

"It's a huge, coordinated effort because we are now seeing the start of what could become a tsunami of resistance washing over Africa in coming years," he said.

Identifying the genes responsible for drug resistance can take up to 15 years from the first signs that treatments are failing.

"So how do you narrow this gap?" Fidock said. "You can't afford to be 15 years behind the parasite."



DAVID FIDOCK

Winning the race

Using genetic crosses between drug-resistant and susceptible parasites, combined with gene editing, David Fidock's research identifies the basis of drug resistance in Plasmodium falciparum, the most lethal of the five human malaria parasite species.

His lab has collaborated with the international public–private partnership Medicines for Malaria Venture to determine whether a candidate in the drug development pipeline is at a higher risk of acquiring parasite resistance. This increases efficiency in discovery and development.

"We don't want to be working with compounds that select easily for resistance," Fidock said, adding such research informs "how we could rationally develop treatments, not only to cure malaria but to slow its rate of acquiring multidrug resistance."

The lab discovered that different mutations in the P. falciparum chloroquine resistance transporter develop resistance to the former first-line drug chloroquine and the current partner drug piperaquine. They saw that parasites resistant to piperaquine often lose resistance to chloroquine because of how the transporter mutations interact with these drugs.

"So, studying these inverse susceptibilities and combining both drugs could potentially block parasites from acquiring multidrug resistance," Fidock said.

Fidock is focusing now on artemisinin-based combination therapies, how artemisinins work, identifying the cause of partial resistance to these therapies and developing better treatments.

Ankita Arora (ankita.arora@cuanschutz.edu) is an RNA-biologist-turned-freelance-science-writer who aims to make science enjoyable and accessible for all. She is an ASBMB Today volunteer contributor.

Guiding grocery carts to shape healthy habits

By Marissa Locke Rottinghaus

In a world of processed foods, a person could spend hours in a grocery store staring at confusing labels while trying to select the healthiest bread. But, imagine how easy grocery shopping would be if you could consult a personal dietician right there in the store.

Matching dieticians and shoppers at risk for cardiovascular disease is just one of the innovative clinical trials Robert "Nate" Helsley has managed. After growing up in rural Ohio and earning a Ph.D. in nutritional sciences at the University of Kentucky, Helsley said he understands how difficult it can be to choose healthy foods.

"Many of the issues are related to convenience and education," he said. "For example, many people do not know how to appropriately read food labels … So, this was an opportunity to address those issues on the front line. That's why I was excited about the job."

After managing clinical trials for a few years, Helsley decided to return to the bench to help improve human health from the ground up.

Now an assistant professor of medicine at the UK College of Medicine, he works to identify the mechanisms that link nutrient metabolism to the development of cardiometabolic diseases. For this work, he won the American Society for Biochemistry and Molecular Biology's 2025 Walter A. Shaw Young Investigator Award in Lipids, which recognizes outstanding lipid research by a young investigator.

Helsley said that his early work on clinical trials motivated his research to find therapeutics for diseases such as obesity, heart disease and liver cancer.

"There are still fundamental issues with how we treat obesity, which includes education, … accessibility of resources and healthy food options," he said. "Seeing how dieticians could help these people really opened my eyes."

ROBERT "NATE" HELSLEY

Leveraging lipid levels to starve liver cancer

Robert "Nate" Helsley takes a nontraditional research approach: He first identifies a disease and then develops translational models to find potential therapeutics. His lab focuses on diseases of the liver. Metabolic dysfunction–associated steatotic liver disease, or MASLD, and metabolic dysfunction–associated steatohepatitis, or MASH, are two of the most common. Only one drug has been approved to treat these conditions, so researchers are pushing to find more and better treatments.

"Understanding how MASLD and MASH can progress to liver cancer is a huge need, especially over the next 15 to 20 years," Helsley said.

Using human liver tissue samples, Helsley examined lipid levels in the tumor and in matched, nontumor samples. He found that monounsaturated fatty acids, made by the enzyme stearoyl-CoA desaturase, or SCD, accumulate in tumor tissue.

Other researchers are exploring SCD inhibitors as a therapeutic option, but Helsley wants to attack the pathway from the opposite end. His target: CPT1A, the enzyme responsible for breaking down, or oxidizing, monounsaturated fatty acids. His lab found that the CPT1A pathway shuts down in human liver tumors, allowing monosaturated fatty acids, the tumor's food source, to build up.

Helsley's plan is to deplete these fatty acids and starve the tumor.

"When the capacity to oxidize monounsaturated fatty acids is turned off, they build up," Helsley said. "It's like yin and yang. … If we can figure out a way to exploit that pathway and turn it on, we think we could further prevent tumor growth."

Helsley will give a talk at the 2025 ASBMB Annual Meeting, April 12–15 in Chicago, titled "The contribution of fatty acid oxidation to diet-induced hepatocellular carcinoma."

Marissa Locke Rottinghaus (mlocke@asbmb.org) is the science writer for ASBMB.

The Art *of* Science Communication

A decade of teaching The Art of Science Communication

Why now, more than ever, scientists must be able to explain what they do

By Marissa Locke Rottinghaus

I wish I hadn't vaccinated my child, the hairdresser said.

Hannah Alexander, an associate professor emerita at the University of Missouri, had been going to the same hairdresser for more than 10 years, and, despite their different lives and backgrounds, they'd become close friends.

"I kind of went off the deep end," Alexander said. "And she was holding the scissors."

When Alexander asked for an explanation, she found out that her hairdresser had no idea where to look for accurate scientific information that she could understand.

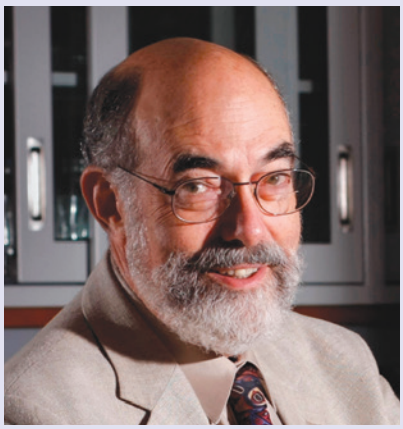
"On the way home, I was thinking, 'It's not her fault,'" Alexander said. "'It's my fault. Nobody's ever reached out to her.'

"We need to tell people that they have a place in science," she said. "Science is not exclusive."

Thomas Baldwin, an emeritus professor of biochemistry at the University of California, Riverside came to a similar conclusion when he learned how little most politicians know about science.

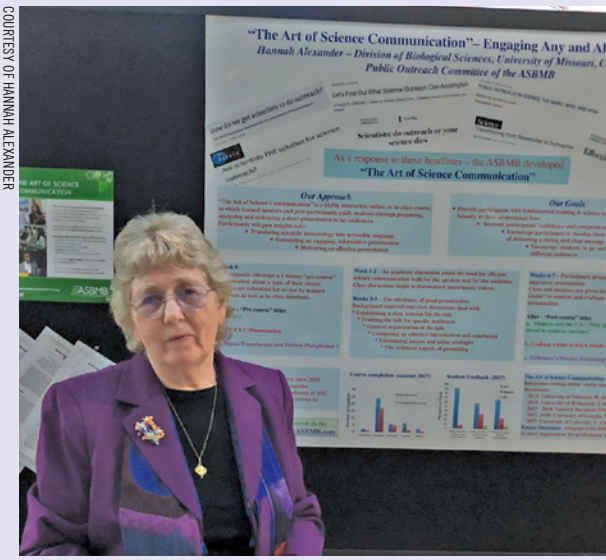
"The onus is on us as scientists to find a way of translating the science out of the polysyllabic world into the world of everyday lay language," Baldwin said.

Thus, the Art of Science Communication course, or ASC, was born. Baldwin and Alexander worked with Susanna Greer, chief scientific officer at the V Foundation, and Geoff Hunt, former American Society for Biochemistry and Molecular Biology outreach manager, to build an eight-week course that would equip participants with the skills and knowledge to effectively and confidently present their science to nonexperts. Their original audience was science trainees. However, in the 10 years since its founding, professionals from all areas of science have benefitted from the course.



Thomas Baldwin

COURTESY OF HANNAH ALEXANDER



Hannah Alexander presents a poster about the Art of Science Communication course at the Experimental Biology 2018 Meeting in San Diego.

As of 2023, 528 scientists from all over the world had completed the ASC online. Students have included undergraduates, graduate students, postdocs, faculty members, meteorologists, engineers, political scientists, entrepreneurs, medical writers and more.

John Tansey, a professor of chemistry at Otterbein University, has taken

and facilitated the course numerous times since its inception. As a facilitator, he provides feedback and guides the discussions among participants each week.

"I did not go into science thinking I was going to be a communicator, but it's clearly part of my job," Tansey said. "I think it's part of all of our jobs at this point."

Science as a story

Nicole Woitowich helped develop the ASC when she was a graduate student. She is still intimately involved, and she runs a satellite version of the course at Northwestern University Feinberg School of Medicine, where she is now a research assistant professor of medical social sciences.

Telling a story is one of the best ways to communicate science, Woitowich said, and thus, is a big focus of the ASC.

"Storytelling has been around since the dawn of humanity," she said. "It's how we communicate information. Scientists are not taught to be storytellers. We're trained to be very dry, factual and to the point. We're not trained to bring emotion into our work. ... The course helps people overcome that and shift their mindset."

Most scientists write and even talk in the third person in papers and presentations, completely removing themselves from the equation. Woitowich said she thinks this is a mistake.

"I often tell folks that, really, you are the person people want to hear about," Woitowich said. "They want to hear about your journey and connections to the work you're doing. I try to help people shift that mindset because I think the narrator, the protagonist, makes the most compelling story."

'Science is for everyone'

"Relatively few scientists will take the time to explain really basic science concepts to someone who is not a scientist," Baldwin said.

The ASC stresses that science jargon is a different language and that good science communicators find the language that works best for their audience.

"The bottom line to me is that science is for everyone," Greer said. "If the scientific community continues to embrace that, we'll just get better as a society."

Following this principle, Tansey designs outreach activities with his students at Otterbein with different audiences in mind. At a local science fair, Tansey's group creates several visual aids and activities that they can bounce back and forth between depending on their audience. One year, their exhibit taught participants about the sense of smell.

"We had different smelly compounds that little kids could smell," Tansey said. "We also had a little matching game where they had to take 3D molecules and fit them into different receptors on a poster board to show that these molecules must bind to a receptor to get a signal on your brain.

"For older kids, we had another poster that talked more in detail about how signals go from neuron to neuron and how signal transduction works. So, we could hit the concept at different levels with either little kids or adults or anyone in between."

Shauna Bennett is an assistant teaching professor at Georgetown University. She said taking the ASC taught her that she must adapt her language and medium to meet the audience's needs. During the COVID-19 pandemic, she helped write a science comic to teach people with little scientific knowledge about SARS-CoV-2. With this project, she had to balance the known and unknown without losing trust.

"I think that the biggest

John Tansey of Otterbein University, center, Kim Dickson, of Lawrence University, left, John Weldon of Towson University, right, and other undergraduate faculty members get to know each other during a round of bingo at the 2023 Undergraduate Faculty Reception in Seattle at the 2023 ASBMB Annual Meeting.

ASBMB

COURTESY OF SHAUNA BENNETT

Shauna Bennett volunteers at the Smithsonian Museum of Natural History in 2019, where she discusses viruses with museum visitors.

challenge in teaching science, is how to explain uncertainty without having the answers," Bennett said.

Empathy

According to the National Science Foundation, public confidence in science and scientists has remained relatively constant throughout the 21st century. However, a 2024 survey showed that most Americans rarely engage in scientific activities, such as helping a child with a science project or participating in a citizen science event.

In the early 2010s, "When the course was created, I think the world was a little bit more innocent," Tansey said. "Partially due to the recent (COVID-19) pandemic, lack of funding, global warming and other scientific issues."

Furthermore, studies have shown that public trust in scientists has fallen since 2016, mainly in the areas of medicine and climate change. A recent NSF survey showed that 60% of American adults report understanding experimental logic, but only 50% could correctly identify a scientific hypothesis. That familiarity with scientific concepts positively correlated with overall trust in science.

"Now, there's a huge section of the public at large who are science skeptical," Baldwin said. "Science is in the ditch."

Communicating with skeptics is important, he stressed, and establishing respect for your audience is key.

"People say, 'Oh, you have to dumb it down,'" Baldwin said. "As soon as you say that, you're lost."

Christina Nixon, who is now the senior scientific director of medical and scientific services at Alphanumeric Systems, took the ASC in 2015.

"The person (we are communicating with) is an intelligent human being," Nixon said. "They don't have the same pieces of information that you have … So, you've got to try to find common ground and think about common knowledge pieces that you can build from."

Bennett agreed and said taking the course taught her to step into the shoes of her students to become a better teacher.

"I think a big part of communication is having empathy for the person that you're talking to," she said. "As scientists, we are trained to be seen as competent to our mentors, professors and bosses. We want to seem like we're able to keep up with the jargon and the ideas. When you're on the side of communicating with people who are not scientists, it's really hard to transition into a completely different way of sharing ideas."

Combatting misinformation

According to the Pew Research Center, more households in the U.S. have internet access than ever before. Combined with the rise in social media use, it has become easier to spread misinformation. A recent survey showed that, as of February 2024, more than 30% of news consumers saw false or misleading information in the media within the last week.

"There's urgency now for scientists

Nicole Woitowich, left, interviews Vineet Arora, Shikha Jain and Annabelle Volgman at a panel discussion on women's health in January 2024.

EILENE MOLONY

COURTESY OF THE V FOUNDATION FOR CANCER RESEARCH

Susanna Greer, chief scientific officer of the V Foundation and co-founder of the ASBMB Art of Science Communication course, speaks at the 25th Anniversary V Foundation Wine Celebration, where the foundation raised $21 million for cancer research.

to communicate with their neighbors, their peers, government, with everyone," Tansey said.

Greer said this urgency is partially due to the COVID-19 pandemic, which she describes as a "science communication miss."

"I don't want people to fear science or scientists or advances," Greer said. "Because life will continue to happen, scary things will continue to happen, and I want people to see science and scientists as solution bringers."

According to Woitowich, the ASC is specifically designed not just to convey scientific knowledge but to counter misinformation by fostering dialogue, a growing necessity in the age of widespread misinformation about science.

In 2020, Woitowich and other ASBMB members conducted a survey of over 160 past ASC participants. According to the survey results, scientists said they were significantly more likely to communicate with nonexpert audiences following the course.

"There are so many voices out there on the internet nowadays," Bennett said. "I think fighting those distractions, it's going to take a lot more than just knowing the audience you have in front of you; it's going to come down to how do you even get their attention, which is so much more than just the title of a talk."

Scicomm on Capitol Hill

The spread of false information or lack of communication could also have an impact on funding allocated by the U.S. government for basic scientific research.

"I think that it is our duty as scientists to explain what we do and why we do it," Greer said. "Unless you are doing science in your garage, you're not the one paying for it … most of us are funded by taxpayers or the federal government.

"Quite frankly, you owe it to them to explain why you're doing what you're doing in a way that it can be relevant and interesting and exciting," she said, "so that taxpayers find a reason to use their tax dollars to fund more of it."

According to the NSF, the federal government funded about 60% of all nonclinical research carried out in the U.S. in 2000. However, that proportion has declined over time and reached 40% in 2022.

"Communication impacts the work we do on a federal level, as the majority of scientific funding comes from, at least in my field, the National Institutes of Health as well as the National Science Foundation," Woitowich said. "We really need to think about how we drive support and trust in science, which circles back to our ability to do science in the United States."

Isha Verma is a research staff member at the University of Michigan Neuroscience Institute. She said she used the skills she gained from the ASC to converse effectively with policymakers on Capitol Hill as an ASBMB Advocacy Training Program delegate.

"The course provides scientists with different tools and strategies to relate to policymakers and funding agencies on cultural, educational or social levels, and influences their perception and trust in research," Verma said. "It is crucial to frame your research in terms of its social and economic benefits."

A confidence boost

According to the 2020 survey of ASC alums, all respondents reported a significant increase in their confidence levels after taking the course.

Ana Zambrana, who teaches biology and English at the Dirección General de Educación Técnico Profesional in Montevideo, Uruguay, said that was true for her.

In 2015, when she was struggling through her master's degree, Zambra-

COURTESY OF ISHA VERMA

ASBMB Advocacy Training Program delegate Isha Verma, left, attends ASBMB Capitol Hill Day in May 2024 with fellow ATP delegate Nidhi Shukla, second from right, and Public Affairs Advisory Committee member Rick Page, right. The group met with U.S. Senator Gary Peters (D-Mich.), second from left, to discuss the importance of fundamental scientific research funding.

na took the ASC, and was pleasantly surprised at its focus on the participants.

Bennett explained that, in the course, "we talk a lot about selling yourself, which can be a departure for many scientists."

Zambrana said the course gave her the confidence to forge ahead.

"When I saw a tweet about the course and signed up, it was a lifechanging moment," she said.

Ana Zambrana

"The course really helped me to finish my master's thesis.

"I was very scared, and I wanted to perform in a professional manner," she said. "It gave me the opportunity to strengthen my skills, compare ideas and change my point of view. When you are doing a thesis, you are so hyper-focused that you lose sight of the rest of the field."

Zambrana, whose native language is Spanish, said the course also strengthened her science communication skills in English.

"The course gave me the chance to rehearse in a different way, in another language," she said.

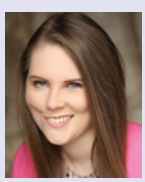
During Zambrana's thesis defense, Uruguay experienced a national electrical blackout. She credits the ASC with giving her the confidence to finish the presentation, without any visual aids.

"It was a very frustrating and stressful situation," she said. "I had to finish, as they say, a cappella, … without any support or graphics … But after the defense, my committee congratulated me and said they didn't think I could pull it off."

After successfully defending her thesis, Zambrana gave back to her community by offering a version of the ASC in Spanish in her home country.

"The opportunity to take the course gave me strength in my professional life and also in my personal life," Zambrana said. "It gave me a perspective that I didn't have before and the chance to be part of the community. It was a very beautiful challenge."

Marissa Locke Rottinghaus (mlocke@asbmb.org) is the science writer for ASBMB.



Turning an 'art' into a full-time job

By Marissa Locke Rottinghaus

The Art of Science Communication course, or ASC, was designed to help grad students and postdocs explain their research to nonexperts. For Christina Nixon and Sarah Ellinwood, it did much more.

Taking the eight-part online course offered by the American Society for Biochemistry and Molecular Biology propelled the two scientists out of academia and into the professional science communication arena.

When Nixon and Ellinwood took the ASC, both were working at the bench in academic labs, Nixon as a senior research scientist at Brown University and Ellinwood as a graduate student at the University of Maryland.

Nixon gave the course a shot because she felt stagnant in her career.

"At Brown, I was thinking 'Am I really in the right place for me? Am I doing what I like to do?'" she said.

Ellinwood stumbled on the course while trying to pinpoint where she wanted to land after her Ph.D.

Both women credit the ASC with opening their eyes to careers in scicomm.

"I didn't really know what else you could do outside of academia and industry," Ellinwood said. "I realized, after giving some presentations and doing some soul searching, that I liked talking about science more than doing the science itself."

The ASC expanded Nixon's professional network, exposing her to science and medical communicators.

"The course opened up a little bit of a new world to me," she said.

Christina Nixon

Ellinwood now runs her own freelance science communication business.

"The course unlocked my creative side again," Ellinwood said. "It gave me that liberty and permission to be creative in science. Science and art are not mutually exclusive."

Nixon works as the senior scientific director of medical and scientific services at Alphanumeric Systems.

"The course helped me realize the bigger picture," Nixon said. "I started to realize that what I wanted to do was be a better communicator of science for folks who are trying to take advantage of all that research that we've been doing."

Nixon said she feels privileged to share amazing scientific findings with the public.

As controllers of the data and the messages, "We get to put on a little white hat," Nixon said.

"As medical writers," she said, "it's our job to make sure that the messages being conveyed are accurate, understandable and true to the science."

When Ellinwood worked in public relations and pitched stories to reporters, she said she always fell back on what the course taught her about audiences.

"Taking the extra time to really look into your audience's needs and figuring out what they actually care about can have a big impact," Ellinwood said.

Ellinwood reinforces this principle while training junior writers.

"I always tell them, 'In media, everything is moving at such a fast pace, and you don't want to take an extra hour to think about the audience, but I promise your writing is going to be so much more impactful if you do."

Both women have led a cohort of students through the ASC.

"I wanted to give back to the course and the community," Ellinwood said. "It had such a big impact on me and made me fall in love with science communication."

Sarah Ellinwood

An inclusive solar eclipse — with outreach

By Christin B. Monroe

On April 8, I took 11 neurodivergent students, with two chaperones (including myself) and one staff member from our college with his family on a 17-hour field trip — 11 hours of which we spent in two vans and one car in bumper-to-bumper traffic that spanned the entire state of Vermont — to see the full solar eclipse in far northern Newport, Vermont.

I am an assistant professor at Landmark College in Putney, Vermont, where I work exclusively with neurodivergent students, including those with autism, attention-deficit/hyperactivity disorder, dyslexia and executive function challenges. I wanted my students to be part of this once-in-a-lifetime event while also engaging in science outreach.

The sunflower area

A phenomenon that was going to attract more visitors to Vermont than a peak day in leaf season might not seem ideal for my students, so I collaborated with the town of Newport, to make the eclipse experience more inclusive for neurodivergent individuals.

We created a "sunflower area," a low-sensory space where my students and others could enjoy the eclipse without loud noises, large crowds and other overwhelming stimuli. We were inspired by the Hidden Disability Sunflower project.

The organizers in Newport reserved a pavilion for us after just a couple of emails and phone calls. This provided a quiet, controlled environment for students who might otherwise have found the experience overwhelming. We asked that families with loud dogs or other high-energy distractions respect the area, and everyone did.

Our students wore sunflower pins to identify themselves as volunteers, helping others understand the purpose of the space. The area worked well as a sanctuary, and our students experienced the eclipse in a way that felt manageable and even serene. The sunflower area gave them room to breathe, creating a space where they could feel a sense of ownership while still being part of a public event.

Eclipse outreach

We brought along lithographs of past eclipses and used them as conversation starters. As a game, my students invited children to place the images in chronological order, helping them learn about the history of eclipses. The game was accessible to children who were blind or had low vision, allowing everyone to participate. My students worked as a team, dividing up roles based on their strengths —some initiated conversations, others led the game and still others shared fun facts about the science behind eclipses.

After nearly a decade of participating in science outreach, this event was one of the most rewarding experiences I've had. I felt inspired watching my students demonstrate their science identities and resilience through outreach.

REBECCA MATTE

Five Landmark College students play an accessible game with lithographs representing past eclipses provided through the NASA PUNCH Outreach program.

The low-sensory space we created was a small but significant adjustment that made the event more inclusive for everyone. Days like this remind me of the power of accessible science communication and the value of creating environments where all individuals can thrive.

Christin B. Monroe (christinmonroe@landmark.edu) is an assistant professor of chemistry and an AIE-STEMPLOS co-primary investigator at Landmark College.

Making cancer dance

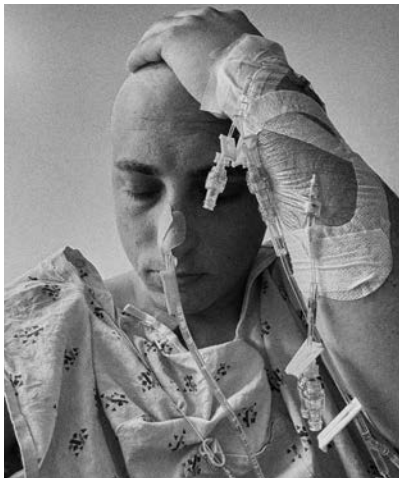
A molecular biologist and a choreographer discuss their collaboration

By Melissa Rowland–Goldsmith & Jacob Jonas

Rowland–Goldsmith: Last summer, I received an unexpected request: The chair of my university's dance program asked me to meet with Jacob Jonas, a visiting choreographer.

In my undergraduate cancer biology course, I teach students how to communicate with nonscientists and, specifically, with cancer survivors, using the American Society for Biochemistry and Molecular Biology's Art of Science Communication course. As a science educator devoted to unraveling the mysteries of cancer biology and a believer in science communication, I'm always open to unexpected collaborations.

Jonas: When we first spoke, I had been in research for a new work about my experience with cancer — not as an emotional journey, but as a cellular one. I wanted to dig into the science behind it and to understand what was happening inside me on the most fundamental level. I hoped that learning the language of cancer biology could help me translate that chaos into movement.



EMMA ROSENZWEIG-BOCK

Jacob Jonas was treated for stage IV diffuse large B cell non-Hodgkin lymphoma. He later turned that experience into art.

EMMA ROSENZWEIG-BOCK

Melissa Rowland–Goldsmith and Jacob Jonas met up in October at the beach in Santa Monica, California. They have continued their friendship and collaboration.

Rowland–Goldsmith: In our first meeting, I introduced Jacob to the fundamental principles of cancer biology — how cells mutate, grow uncontrollably and evade the body's defenses. But I wasn't simply explaining cancer biology to a choreographer — I was speaking to someone who had lived on the battlefield, someone who wanted to translate cellular rebellion into a form of beauty.

Jonas: I was most interested in exploring themes of randomness inside the body, metastasis and the mind–body connection — especially how emotional stress can lead to illness.

I was thinking about cells separating from a group and how randomness can lead to growth or disruption, an image that translated easily to a dancer breaking away from the group, disrupting the harmony. But I wanted Melissa to see the process for herself to understand how the conversation and tools were shaping it, so I invited her to attend a rehearsal. And we began the weaving of two worlds.

Rowland–Goldsmith: At that rehearsal, I saw how Jacob created choreography that reflected the chaotic nature of cells — a dancer moving separately from the rest of the group much as cells break away from the body's rhythm.

I was fascinated when Jacob had the students improvise to ultimately choreograph dance moves showing

cells acquiring mutations that led to cancer, and I was so impressed with the physicality of their movements. I saw my research transformed into something visceral, something felt. Science was no longer confined to a laboratory; it was unfolding in the sweat-soaked bodies before me.

At the end of the rehearsal, the dancers gathered around me. I shared some basic elements of cancer biology and drew parallels between what they had just danced and the scientific concepts. I invited them to visit a colleague's lab to look at cancer cells under a microscope, breaking down the walls that typically separate our disciplines.

Jonas: When Melissa spoke with the dancers, helping them see the biology within their movements, they weren't just dancing anymore; they were embodying a story about cellular rebellion, about the body's defenses being tested.

In the following weeks, our collaboration deepened. I visited Melissa's cancer biology class — on a day she brought in a poet to talk about the intersection of science and art.

That experience impacted me deeply. Not having excelled academically, I valued connecting in an academic environment and feeling so much care and knowledge. That day reminded me how communication across disciplines and fields can bridge gaps. I saw how the students were trained to communicate their research in ways that reached beyond science, to deeply understand humanity and empathy, and that all work needs curiosity and dialogue.

Rowland–Goldsmith: Many of my students told me that the class Jacob attended was — by far — the most impactful and life changing they'd experienced at that point in the semester.

JACOB JONAS

Jill Wilson and Emma Rosenzweig-Bock of Jacob Jonas The Company in motion on a California beach.

Jacob returned the favor and invited me and my entire class to attend a dance performance. My students watched dance, some for the first time, and saw how movement could transform abstract scientific ideas into something felt and understood on a deeper level.

Jonas: Since then, we've been exploring what more we could do together. There's a sense of possibility in the way we are bridging biology and dance. The power of the arts and sciences working together can shine light on the importance of innovation and expose new ways of thinking, bringing value to different areas of focus.

Rowland–Goldsmith: Our collaboration shows that when science and dance collide, we can create something new — a dialogue that transcends traditional boundaries, offering deeper insights into our cells, mind and body.

Jonas: That transcendence has been the most powerful part of this process. We are not only communicating knowledge but inviting people to experience it, to feel it in their bodies. That's a different kind of understanding, one that reaches beyond words. And, in the larger sense, something that brings us closer to understanding health in a more holistic way.

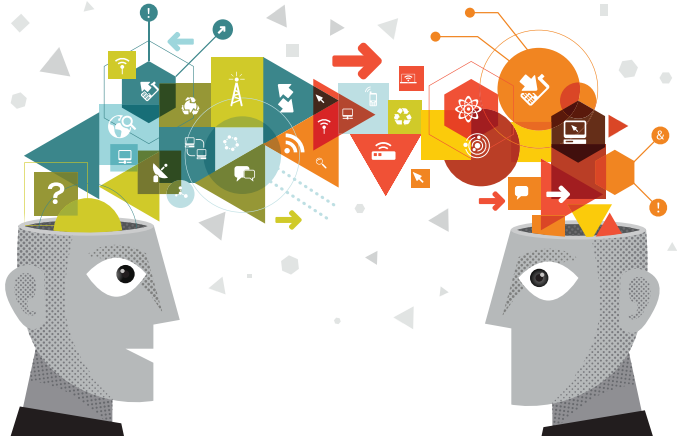
(Go to asbmb.org/asbmb-today to see video of members of the Chapman University dance program rehearsing Jacob Jonas' choreography based on his collaboration with Melissa Rowland–Goldsmith.)

Melissa Rowland–Goldsmith (rowlandg@chapman.edu) is a biology and biochemistry and molecular biology professor at Chapman University. She serves on the ASBMB Science Outreach and Communication Committee and is the chair of the Science Communication Subcommittee.

Jacob Jonas is a Los Angeles–based choreographer and founder of Jacob Jonas The Company.

Scientists must overcome outreach barriers

By Elisabeth Marnik



I entered the world of public science communication in March 2020. COVID-19 dominated the news and misinformation was everywhere. I felt a responsibility to help my family and friends access understandable information. Pretty soon people were asking to share my posts, and this motivated me to form an official account to reach more people.

If someone had told me then that in 2024 I'd be educating over 30,000 people via social media, I would have thought they were crazy. But I've learned that this work is an essential part of what it means to be a scientist.

Numerous scientists, myself included, encourage our colleagues to communicate with the public. To make this happen, the scientific community must address the barriers some scientists face when they consider public engagement.

When I began to research why some scientists hesitated to do this work, four main themes emerged.

Concerns about perception. Some scientists are afraid their peers will see them as seeking fame or as less skilled or productive in their lab work. Contrary to these concerns, research indicates that engaging with the public can yield numerous benefits including finding a common language with other disciplines, networking and helping scientists be more active academically.

Lack of institutional support. Universities and other institutions often do not prioritize or recognize public engagement in promotion or tenure considerations, nor do they always provide the necessary support and resources for faculty who want to engage with the public.

Time constraints. If institutions do not value public engagement in promotion and tenure processes, scientists may struggle to allocate time for such activities among their already numerous responsibilities.

Lack of confidence and training. Some scientists may be interested in engaging with the public but feel unsure of where to begin or how to approach these conversations. They may not know the best practices for public engagement to make their efforts most effective.

Once these barriers are identified, we can work to address them. For instance, teaching public engagement in undergraduate, graduate and postdoctoral programs can help reshape perceptions of this work and help us emphasize its crucial role. We can incorporate public communication and outreach training into the curriculum to provide students with the skills they need to effectively engage with the public. This can help foster a culture in which such work is seen as integral to scientific practice.

Furthermore, university administrators or members of promotion and tenure committees can advocate for faculty engagement in public outreach. They can recognize these efforts as significant contributions to scholarship and service rather than ancillary activities. Faculty members could then prioritize public engagement without seeing this work as detracting from their other responsibilities.

None of these changes are easy, but this work is important. The COVID-19 pandemic showed us how the impact of science extends beyond the laboratory. Public perceptions of scientific issues directly affect individual health, societal attitudes and behaviors. This includes support for and funding of scientific research.

By talking to the public about our work, we can help rebuild a society that acknowledges the significance of science in everyday life and ensures that everyone has access to the information we need for informed decision-making.

Elisabeth Adkins Marnik (emarnik@mdibl.org) is the science education and outreach coordinator at the MDI Biological Laboratory in Bar Harbor, Maine, where she is spearheading the development of new programming. She is an ASBMB Today volunteer contributor.

From curiosity to conversation: My first science café

By Ed Eisenstein

Why was I so nervous? I'd spoken in hundreds of seminars and classes, in front of large audiences and even politicians and lawmakers. So, why was I clammy and pacing?

Admittedly, I'd never explained my research to a crowd of nonscientists relaxing over food and drink at a local tavern. Was I afraid the audience might oppose genetically modified organisms? Or question the environmental risks of recombinant DNA?

It was 2016, and I was hosting one of the first science cafés for the Rockville Science Center, a nonprofit I'd established with a group of interested citizens and a local chapter of the research honor society, Sigma Xi.

With biotechnology booming and many major government labs nearby, we thought Rockville, Maryland, was the ideal location for a center focused on explaining science to the public. We wanted to put on science presentations in the style of Ben Wiehe.

Wiehe now heads the Science Festival Alliance, but back in the day, he worked at Boston's public TV station and pioneered the concept of science cafés. He used to walk into Boston bars and start talking about all things science. No slides, no flip charts, just conversation. And that's what we wanted to do: share science in bars, restaurants, community centers — anywhere.

I was the inaugural leader, giving the first presentation to a packed crowd.

As soon as I started chatting about the research in our university biotechnology institute, I realized my anxiety was unfounded. Everyone paid rapt attention. Although my presentation lasted only 10 minutes, the audience questions kept me under the spotlight for over an hour.

The audience was more receptive to technology than opposed. A few questions pertained to translating basic science into cures and therapies: How long does it take? How much does it cost? Parents asked how their children could learn how to do science that makes a difference. And a couple of people asked about risk, compliance with regulations and safety. But really not too many.

Afterward, more than a few people offered to buy me a drink to continue the conversation.

That science café allowed me to connect with the public and communicate all types of science. I've done more than a handful since, but I'll never forget my first. You should host one too; it's a great experience — for everyone.

COURTESY OF ED EISENSTEIN

Ed Eisenstein interacts with the audience at a 2019 science café.

Ed Eisenstein (eisenstein@umd.edu) is an investigator at the Institute of Bioscience and Biotechnology Research and a faculty member of the Fischell Department of Bioengineering at the University of Maryland. He is a member of the ASBMB Council.

'One word or less'

By Howard M. Steinman

Julius Marmur had a reputation for being a bit brusque. When I joined the biochemistry department at the Albert Einstein College of Medicine, the renowned DNA biochemist became my senior colleague. I recall seeing him in his office, puffing on cigars.

During a long-forgotten hallway or conference room encounter, Julius asked me a question. Caught off guard, I hesitated. He said to me, "Steinman, just answer my question in one word or less."

Over the years, that phrase, "one word or less," stuck with me. For a long time, I thought of it as a joke: Less than one word is no words, and you can't answer a question without words. However, I've recently come to see it through a Marmur-ian lens: If you can't answer succinctly, then don't bother to reply.

Yes, communication is great. But sometimes, it's prudent to say less than one word and wait until you're on track and able to give a meaningful answer.

Howard M. Steinman (howard.steinman@einsteinmed.edu) is a professor of biochemistry and assistant dean for biomedical science education at the Albert Einstein College of Medicine.

Guiding my sister through cancer

Communicating the science sometimes takes a backseat

By Parmvir Bahia

COURTESY OF PARMVIR BAHIA

Parmvir Bahia, right, moved to the U.K. to be with her sister Sukhy, left, during her cancer treatment.

My sister was diagnosed with breast cancer just before the pandemic; Sukhy went through surgery, chemo and radiation therapy while navigating COVID-19 precautions. She had just been given the all-clear when, in August 2022, we learned the reason for her continuing chest pain: Her cancer had metastasized to her liver and bones. The doctors told us her disease was now incurable.

As a scientist and communicator, I made it my mission to help Sukhy understand her disease. I immediately started scouring the internet for information on secondary breast cancer and treatment options. I moved back to the U.K. to support her and my family and started attending as many of her hospital appointments as I could.

We knew that her diagnosis meant Sukhy would be on treatment for the rest of her life. This news came with a barrage of information, but little I — or any of us — could control. However, I can help her understand what's happening to her body and how the therapies work. I can reassure her that, thanks to the complexities of biology, certain test results don't always mean bad news.

When I go with her to appointments, I've noticed that physicians sometimes share incorrect information or appear to misunderstand the underlying biology. For example, Sukhy was being recruited for a clinical trial involving a targeted antibody-conjugated chemotherapy. She asked her oncologist whether hair loss might be one of the side effects. The oncologist replied sadly that, yes, it would. I had read through the paperwork for the trial, and I knew the benefits of this treatment are reduced side effects thanks to its specificity.

I was frustrated and I wanted to correct the doctor. As a communicator, I always want to supply people with the best information possible. But is that always necessary?

Stepping back, I considered what was most important in this situation: I wanted my sister to receive the best care possible and leave an appointment feeling positive.

So, I could point out that this doctor is not up to date with the research or argue about her treatment options. But would that change the standard of care? No. In fact, it might leave Sukhy feeling anxious or stressed about her care team, undermining my goal.

On days she's upset about the progression of her disease, Sukhy's not interested in a TED talk on tumor evolution. She needs comfort. On those days, I'm there with hugs in place of words.

I will always advocate for my sister and explain concepts she doesn't understand. I would never knowingly omit information I thought she needed. But considering the bigger picture, sometimes there's greater value in what I choose not to say.

Parmvir Bahia (parmvir.bahia@scientistsinc.org) is the CEO of Scientists Inc and Artha Science Media, director of the taste of science festival and host of the 2Scientists podcast.

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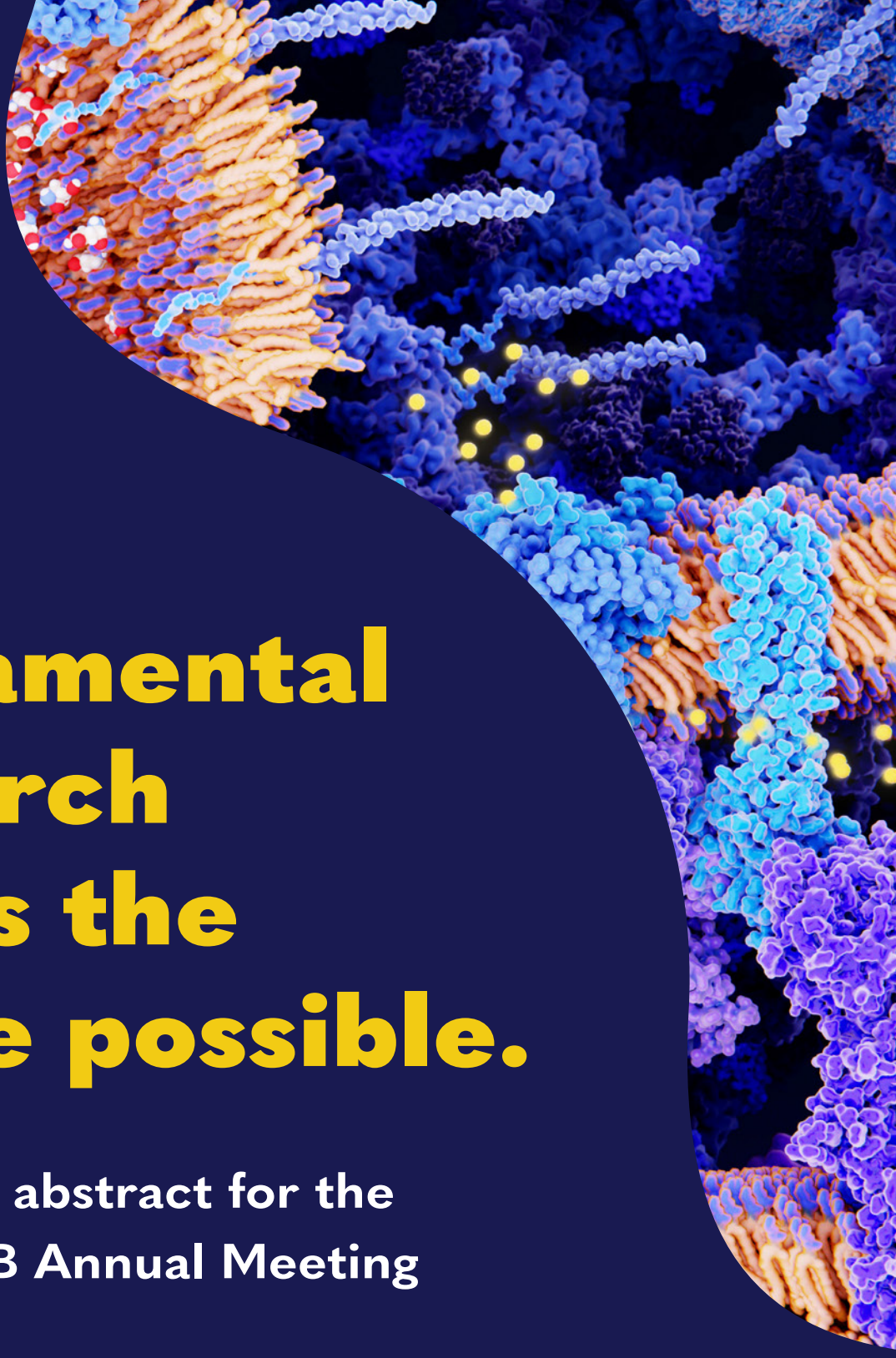

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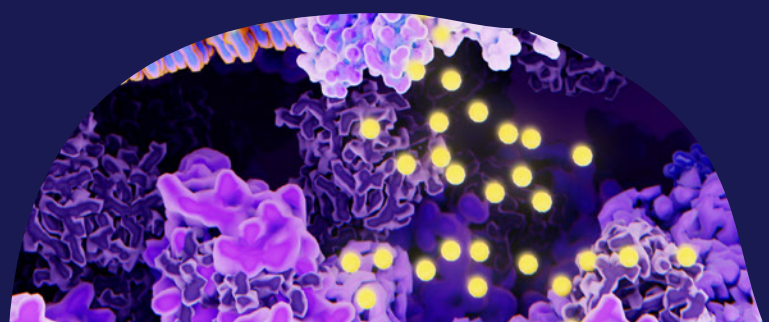

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