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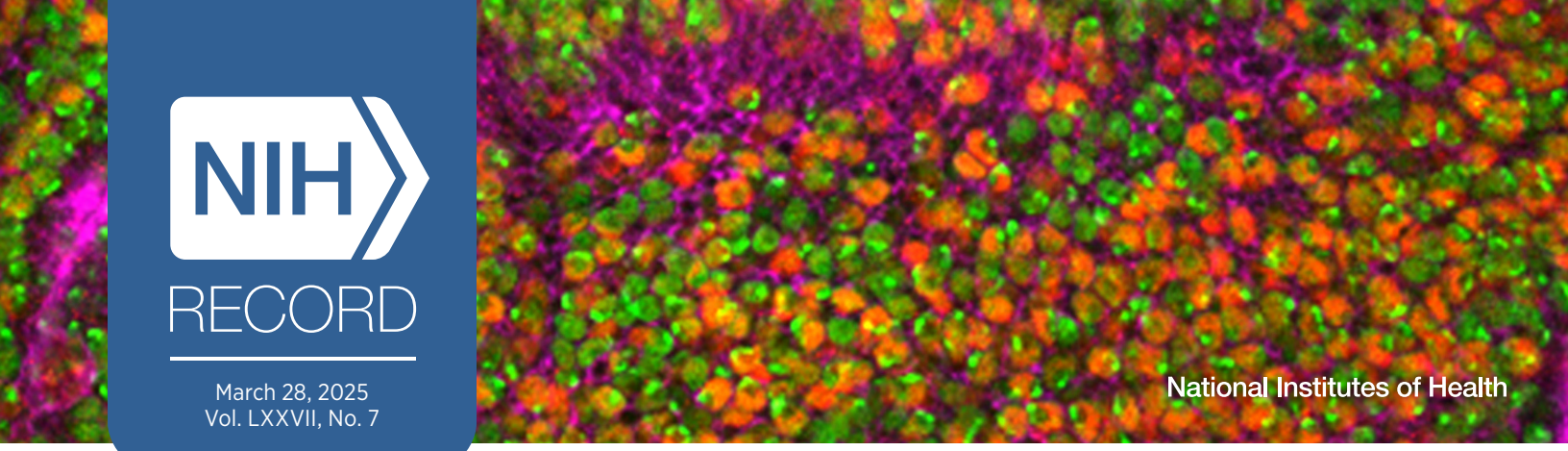


CRITICAL CONVERSATIONS

Spero Shares Personal Struggles with Rare Disease

BY DANA TALESNIK

Imagine feeling fatigue, pain or otherwise unwell on a regular basis. On any given day, work, daily tasks, or just getting out of bed in the morning might be a struggle. For many people living with rare and other chronic diseases, this is their reality.

Millions of people in the U.S. live with "invisible illnesses," in which they look fine on the outside, but in fact are chronically ill. They're everyday people trying to lead productive and fulfilling lives, but sometimes it's a chore just to get through the day.

Harper Spero helps people for a living—as a business coach, development consultant, community builder and through her podcast, Made Visible, illuminating stories of invisible illness—while she herself copes with a rare disease that often leaves her feeling depleted.

Harper Spero returns to NIH annually as part of a protocol that studies Job's syndrome.

Spero has a rare genetic disorder called Job's syndrome, also known as hyper-IgE syndrome (HIES). The disease affects multiple parts of the body, notably the immune system, leading to recurrent lung, skin, bacterial and other serious infections.

Every year, Spero comes to NIH for checkups, as part of a natural history study. During her most recent visit in February, she reflected on physical and emotional issues related to her syndrome.

"Bad days for me usually mean feeling totally drained, like I have nothing left to give," Spero said. "If I don't sleep well, my body just shuts down, and I'm running on empty."

SEE **SPERO**, PAGE 5

Astronauts visit the Clinical Center. See p. 8.

ALSO THIS ISSUE

SKIP THE DRAMA

Gallo Offers Tips on Embracing Healthy Conflict

BY DANA TALESNIK

Conflict is uncomfortable. It's also inevitable. There are choices, though, in whether and when to engage. How people react in the moment, and how they approach looming disagreements, can make or break relationships.

"When we think about disagreement, we are fighting our own human nature, our instinct to collaborate and be in harmony," said Amy Gallo, author and workplace coach, at the first Deputy Director for Management (DDM) seminar of the 2025 season.

Amy Gallo discusses ways to handle conflicts that enhance collaboration and productivity.

Consequence of Inaction

When deciding how to respond to conflict—whether to speak up, push back, shift the conversation, or stay silent—there's risk in that moment, noted Gallo. "When we feel under threat, when we feel all those negative emotions, we assess risk very differently," she said.

People tend to focus on the possible consequences of speaking up. But Gallo suggested considering the alternative.

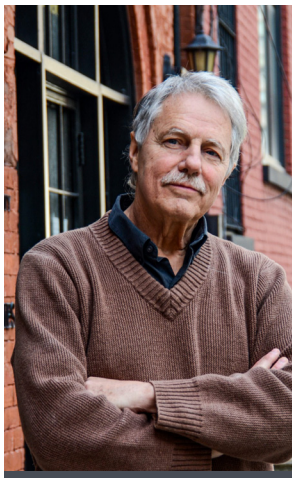
"One of the most important things when you're in those moments of stress, when you're trying to figure out 'should I engage in this disagreement,'" she said, "is ask yourself: 'What if I don't say anything

SEE **GALLO**, PAGE 4

Lecture to Highlight Mechanisms Behind Development of the *Drosophila*'s Visual System

Apr. 23

Dr. Claude Desplan, professor of biology and neural science at New York University (NYU), will deliver the 2025 Joram Piatigorsky Basic Science Lecture on Wednesday, April 23 from 3:00 to 4:15 p.m. ET. The lecture will take place in-person only, in Masur Auditorium in Bldg. 10.



Dr. Claude Desplan

Made possible by the philanthropic support of Lona and Joram Piatigorsky, this endowed series brings special consideration for basic eye and vision scientists who take risks exploring little-studied species and imaginative ideas. Desplan's lecture will discuss the stochastic (random) mechanisms behind the development of the *Drosophila* visual system, and the transcriptional networks that regulate these cell fate decisions.

The lecture is sponsored by the Foundation for the National Institutes of Health (FNIH) and NIH's National Eye Institute (NEI). A light reception will follow the lecture. Trainees and scientists from all across NIH are encouraged to attend.

The Clinical Center's SRLM Tops Out

On Feb. 27, staff from the Clinical Center and Office of Research Facilities attended a special "Topping Out" event on the ground floor, marking the completion of the top floor of the Surgery, Radiology, and Laboratory Medicine (SRLM) wing.

Hosted by the construction company Hensel Phelps, the event celebrated the hard work and collaboration of all teams involved in this transformative project. The SRLM wing construction, which will continue until 2029, aims to modernize hospital facilities and ensure that the Clinical Center remains a leader in high-quality patient care and cutting-edge biomedical research.

Above, the SRLM under construction and some of the crew working on the project

PHOTOS: MARIA MASLENNIKOV

TYCTWD and Earth Day 2025 Are Cancelled

Unfortunately, this year's Take Your Child to Work Day and Earth Day events, scheduled for April 24, have been canceled.

NIH has proudly participated almost every year in TYCTWD since 1994, providing a valuable opportunity for employees to share the significance of scientific research and discoveries with their children, and inspiring our future scientists, engineers, project managers, veterinarians, and grants administrators, to name a few. The Office of Program and Employee Services in NIH's Office of Research Services (ORS) hopes to restore this event in the future.

Spring into Health!

NIH's fitness centers—on the main campus (Bldgs. 53 and 31) and at Rockledge II—are offering a Spring into Health membership special that waives the start-up fee in April and May. They offer scheduled group equipment orientations. And, some in-person fitness classes will gradually resume.

The Bio-Measure machine from Kaiser Permanente is returning for 6 weeks in April 2025, located at the fitness centers in Bldg. 31 and Rockledge. The Bio-Measure System is a self-service device that accurately measures weight, height and body fat percentage, and calculates body mass index (BMI) at the push of a button. The device measures and provides the results on a printed ticket to each user in less than a minute.

The Bldg. 31 Fitness Center has new weights.

For more information, see: https://bit.ly/3ETdI54.

NIAMS Highlights Autoimmune Disease Research

In March, for Autoimmune Disease Awareness Month, NIH amplified related research and resources.

The body's immune system is a network of cells and tissues that work together to defend against viruses, bacteria and infection. It tries to identify and destroy harmful invaders.

In autoimmune diseases, proteins known as autoantibodies target the body's own healthy tissues by mistake, signaling the body to attack them. There are numerous types, including many that impact the joints, muscles and skin.

To learn more about NIH research on such autoimmune diseases as lupus, alopecia, psoriasis, Sjogren's disease, rheumatoid arthritis and vitiligo, see: go.nih.gov/mUIKdV2.

NIH Centralizes Peer Review

NIH recently announced plans to centralize peer review of all applications for grants, cooperative agreements and research and development contracts within the agency's Center for Scientific Review (CSR).

The proposed approach is expected to save more than $65 million annually by eliminating duplicative efforts across the agency, making the review process more efficient.

"At NIH, we are working to optimize our resources to support the best science," said Acting NIH Director Dr. Matthew Memoli. "By centralizing the peer review process, we will not only reduce costs—we will also improve the quality, consistency and integrity of review, and maximize competition of similar science across the agency."

More than 80% of NIH's funding overall supports research institutions across the country, largely through competitive grants that are administered by Institutes and Centers (ICs) or the NIH Office of the Director.

Funding decisions are made through a rigorous dual-level review process. Scientific review groups or study sections, first evaluate and score research proposals for scientific and technical merit. Study sections are made up of volunteer scientists, mostly from academia, and overseen by NIH staff known as scientific review officers.

PHOTO: ASIAN ISOLATED/SHUTTERSTOCK

Advisory councils for NIH ICs and the NIH Office of the Director then perform a second-level review for mission relevance. Ultimately, IC directors make final funding decisions, taking into consideration current research priorities and the existing funding portfolio.

The new centralization effort will apply to the first stage of the review process. NIH's CSR, which was established in 1946 to manage the scientific review of NIH grant applications and to ensure independent, expert review free from inappropriate influence, currently manages the peer review process for more than 78% of NIH grants. The remaining 22% are reviewed in study sections within 23 ICs, each operating separately with its own administrative and support overhead. The proposed consolidation would eliminate the IC-based study sections so that CSR conducts all first-level review.

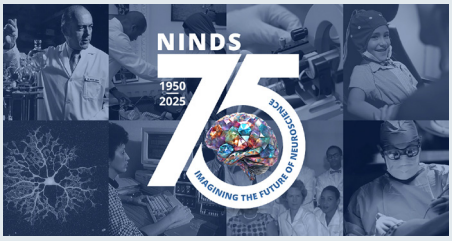
According to an analysis of FY24 data, CSR uses 0.3% of the NIH budget to review more than 66,000 applications annually. In comparison, review costs in the ICs average about 300% of CSR's costs.

"Centralized peer review will mitigate the potential for bias by entirely separating the peer review and funding components of NIH," said CSR Director Dr. Noni Byrnes.

NIH's proposal is now under review with implementation pending external review. This includes review by HHS and the Office of Management and Budget, providing Congress with a 15-day notification period, and issuing a Federal Register notice.

NINDS Marks 75 Years of Neuroscience Research

BY SHANNON E. GARNETT



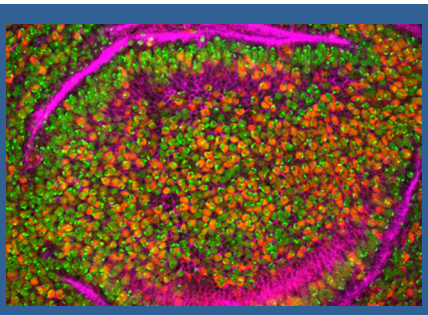
This year, NIH's National Institute of Neurological Disorders and Stroke (NINDS) marks its 75th anniversary. Since 1950, the institute has played a significant role in unraveling the complexities of the brain and nervous system and helping to advance the understanding of a wide range of neurological disorders.

From breakthroughs in learning how brain cells communicate with one another, by studying their structure and function, to testing new diagnostic tools and developing cutting-edge treatments, NINDS has been at the forefront of trailblazing research and continues to lead the way in neuroscience discoveries.

Neurological conditions—which affect the brain, spinal cord, peripheral nerves and neuromuscular system—exact an enormous toll on people of all ages throughout the United States and the world. NINDS's commitment to training the next generation of scientists, working closely with people with lived experience and translating research into real-world applications has improved countless lives.

"For seven decades, NINDS scientists—those funded through grants and working at universities, medical schools, hospitals, other public and private institutions and those conducting research in labs and branches at NIH—have developed innovative technologies and models of disease that have greatly expanded what we know about neurological disorders and transformed that knowledge into better treatments and methods of prevention," said NINDS Director Dr. Walter Koroshetz. "Yet despite all that we now know about the brain, there is much more to learn. NINDS will continue to explore new avenues in neuroscience in our quest to conquer brain disease and improve the quality of life for millions of people worldwide."

As its 75th year continues to unfold, explore NINDS's rich history and join in imagining the future of neuroscience. Learn more about NINDS's anniversary activities at https://www.ninds.nih.gov/about-ninds/75th-anniversary.



ON THE COVER: *The human CBFA2T3-GLIS2 fusion protein is a key driver of pediatric acute megakaryoblastic leukemia (AMKL), and confers a poor prognosis. Researchers found a way to express CBFA2T3-GLIS2 (red) in larval Drosophila (fruit fly) wing disc cells, confirming a major role for the BMP signaling pathway. This pathway may provide a target for new therapies. Nuclei (green) and actin filaments (purple) are also shown.*

IMAGE: NCI/ST. JUDE CHILDREN'S RESEARCH HOSPITAL

The NIH Record

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National Institutes of Health
Turning Discovery Into Health

Gallo

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right now?'" Consider the consequence of inaction.

Even when relations seem copacetic, frustrations may be bubbling under the surface. "When we default to not saying anything," Gallo said, "there are lots of unspoken ideas, opinions, perhaps simmering resentments and tensions, that haven't been voiced. It's not a comfortable space to be."

In deciding whether to engage, Gallo said, ask yourself: Is this disagreement helping us explore different perspectives toward making a better decision? Is this disagreement helping us move toward our goal? Is it building the relationship and enhancing trust?

Healthy conflicts are opportunities to learn and grow.

PHOTO: SHOTPRIME STUDIO/SHUTTERSTOCK

Most people have a default conflict style, said Gallo. People tend to either avoid or seek and lean into a conflict. Avoiding conflicts, she noted, tend to breed more conflict.

When the conversation gets tense, it's easy to get emotional. Give space to the issue and reconvene when you feel calmer.

Handling Challenging Interactions

When tensions arise at work, try to understand the other person's perspective, said Gallo.

"Try to imagine why the person is behaving this way," she said. "Why are they standing their ground on this? That will give you information that, when you actually begin to engage in the discussion, will help you propose a solution that both you and the other person can live with."

Also, know what you're disagreeing about, Gallo said. It might be a personality or value difference. But is there something else simmering?

Usually at work, disagreements arise over the goal itself or the process of achieving the goal. If people disagree about both, it becomes a status conflict with both sides vying over who has authority or who gets credit. State the disagreement, Gallo said, and clarify what's at stake.

Be clear on your goal. "What you're trying to achieve will inform how you decide to handle it," she said.

A shared goal is an excellent starting place for a challenging conversation. If and when you choose to engage, reiterate the shared goal, state your intention to collaborate and ask a question, Gallo advised. What am I missing? How are you seeing this?

"Asking a question—an open-ended conversation that invites their input—puts you both in a much more collaborative mindset," she said. Be curious. Shift the tone by depersonalizing the conversation and focusing on what's at stake.

★★★

"Asking a question—an open-ended conversation that invites their input—puts you both in a much more collaborative mindset."

-AMY GALLO

★★★

Promoting Psychological Safety

First coined by Harvard Professor Dr. Amy Edmondson, the term "psychological safety" refers to the shared belief that people are encouraged to express ideas and concerns.

While it's imperative for leaders to create psychological safety, Gallo noted that anyone can help cultivate it. Research shows it helps foster innovation, creativity, risk-taking and continuous learning.

Gallo shared three pillars of psychological safety: caring—you're invested in one another's success; consistency—acting in a reliable and predictable way so your team knows what to expect; and candor—speaking openly, unafraid to deliver bad news.

"When done correctly, psychological safety can be really uncomfortable," Gallo noted. "People are voicing opinions, sharing feedback, admitting mistakes. It's okay if it doesn't feel great. The question is: Is this discomfort moving us toward our goals, toward more trusting relationships, toward more transparent conversations?"

Whatever our mistakes and the potential fallout from them, a psychologically safe environment enables teams to learn and grow from them. However, psychological safety can easily erode. "As leaders, we have to think about what we're doing to continuously build it."

When deciding how to respond to a conflict, consider the challenge as a learning opportunity. Have empathy. Have self-compassion. Try to steer the conversation back to the task, goal and underlying issue.

"You do not need a shared worldview with the people you work with. You do not need to see everything exactly the same way," Gallo said. "You just need to agree on the next step forward." R

Gallo (l) chats with NIH DDM Dr. Alfred Johnson during the Q&A of this virtual leadership seminar.

Spero

CONTINUED FROM PAGE 1

Over the years, Spero, who is self-employed, has readjusted her work schedule to prioritize her health. "I know my body and I know what I can handle," she said, noting she works better in the afternoon and evenings. "I'm able to accomplish everything I need to do based on a schedule I've created for myself."

She also has adjusted her personal activities, by setting boundaries and advocating for herself.

"I know how important rest is—along with yoga, acupuncture, fresh air, eating well and, most of all, actually listening to my body," she said. "I can't force myself to push through plans when I'm not up for it, and sometimes that means canceling, even when I don't want to. Living in New York makes this tricky, since everything is scheduled way in advance, but that doesn't always work when your health is unpredictable."

Some people in her life though have not been sympathetic to her situation. Have compassion, she urged, "because you just have no idea behind the scenes what people are dealing with."

Spero had first arrived at NIH in crisis. In 2012, she needed to know whether she could have surgery to remove a large cyst on her lung. Was it safe for someone with her rare syndrome to have that procedure? That spurred her to connect with the team at NIH that specializes in HIES, and she remains grateful for their exceptional guidance and care since then.

She shared, though, a personal concern that she hopes will help inform clinical care and spark dialogue in the women's health field.

"When I think about coming to NIH 13 years ago in dire circumstances, where Dr. Alexandra Freeman and Dr. Steve Holland saw me within 48 hours of being in touch with me, and knowing that what I was dealing with needed to be dealt with immediately, I remember my parents asking: 'Is there anything else we should be considering given this genetic condition?'"

Her care team then mentioned there is a 50% chance her future child would inherit the syndrome. "At the time, I was 27 years old and I was about to undergo this hardcore surgery," Spero recounted. "The last thing I was thinking about was having kids."

Spero (l) with NIH's Dr. Alexandra Freeman in 2019

Several years ago, she began thinking about one day having children. And she soon realized, "I didn't know what I didn't know, and I didn't know what to ask."

"Things started to unravel as I started getting deeper into it," she said. "I learned that it would likely be very unsafe for my body to handle pregnancy due to my condition and the medications I'm on that keep me alive." This realization was devastating and she is still trying to process the news.

Freeman, a senior clinician at NIH who specializes in Job's syndrome, said her team needs to better inform their patients about the risks surrounding pregnancy and fertility.

"With Harper, I don't think we did a great job with that," Freeman acknowledged. "We've really tried in the last few years to talk more with our patients about family planning."

Spero said such conversations are critical across the medical field, and particularly for women of childbearing age who have genetic conditions.

"I think it's a societal issue. It's not just in the rare disease world," she said. "There's an opportunity at NIH [to consider] the importance of education around this topic, and how that can be fit into the incredible work that's done there."

Spero continues to navigate ways to preserve her health while advocating for herself and others with invisible illnesses. She considers her limits while seeking out activities that rejuvenate her.

"I'm a big believer of finding a balance in everything I do," she said. When living with a rare or other chronic disease, "It's important to get honest with yourself, know what you have the capacity for and stick with that, because you know what's best for your body."

To access episodes of the Made Visible podcast, see: https://harperspero.com/made-visible.

Read the *NIH Record*'s previous story on Spero here: https://go.nih.gov/JWXxAU8. R

VOLUNTEERS

Esophagitis Study Seeks Participants

Dr. Gregory Constantine and his team at the National Institute of Allergy and Infectious Diseases (NIAID) are conducting a study to explore the effects of Zemaira® for individuals with eosinophilic esophagitis (EoE). This study aims to understand how people with EoE feel while taking Zemaira® and whether it provides any benefits.

By joining this research, you'll have the opportunity to contribute to medical advancements that could improve care for those with EoE. Every patient plays a key role in shaping future treatments and expanding knowledge about this condition. Want to be part of something meaningful? Contact the NIH Clinical Center Office of Patient Recruitment at 866-444-2214 (TTY: 7-1-1) or email ccopr@nih.gov. Be sure to reference Research Study #001854-I when reaching out.

NINDS Mourns Scientist Emeritus Hallenbeck

BY SHANNON E. GARNETT

Internationally renowned neurologist Dr. John Hallenbeck died on February 9. He was a scientist emeritus with NIH's National Institute of Neurological Disorders and Stroke (NINDS).

Hallenbeck was the founder and chief of the Stroke Branch in the NINDS intramural program, where he served for nearly 30 years. He was known for his outstanding research, mentorship and leadership. Upon his retirement from civil service in 2018, he was honored with the title of scientist emeritus.

Dr. John Hallenbeck

"John was a valued leader in the intramural program and an esteemed member of the NINDS family. He led the Stroke Branch by example, providing strong mentorship to colleagues, fellows and staff," said NINDS Scientific Director Dr. Jeffrey Diamond. "His legacy endures through the monumental contributions he made to stroke research, treatment and prevention, and through the many scientists he worked with, mentored and inspired."

A pioneer in the field of neurovascular inflammation and stroke protection mechanisms, Hallenbeck was among the first to recognize the importance of vascular inflammation and neuroinflammation in stroke, and the potential of ischemic tolerance to prevent cell death. His groundbreaking work significantly advanced our understanding of stroke pathology and highlighted inflammation as a critical area of research in neurodegenerative diseases.

Hallenbeck's seminal research on ground squirrels shed light on how the process of hibernation protects the brain by activating SUMOylation, a cellular mechanism crucial for protein function regulation. His further studies demonstrated that SUMOylation also protects the rodent brain from stroke.

Together with the members of the NINDS clinical investigations section, Hallenbeck studied ways to prevent the development of spontaneous brain infarcts in hypertensive, stroke-prone rats. With his team, he explored endogenous neuroprotective mechanisms that induce tolerance to hypoxia and ischemia in brain cells.

His research into E-selectin—a cell adhesion molecule expressed exclusively on endothelial cells—has highlighted the potential of immunization through mucosal tolerization as a viable therapeutic approach. He demonstrated that intranasal administration of recombinant E-selectin can suppress both thrombotic and hemorrhagic strokes in spontaneously hypertensive, genetically stroke-prone rats. This strategy holds promise for protecting the brain from ischemic injury, autoimmune encephalitis, vasospasm in subarachnoid hemorrhage, white matter damage and vascular cognitive impairment.

Hallenbeck earned his BS in medicine from the University of South Dakota in 1964 and his medical degree from the University of Pennsylvania in 1966. Following a medical internship and neurology residency at the University of Michigan, he joined the U.S. Navy. At the Naval Medical Research Institute—part of the National Naval Medical Center (NNMC, now the Walter Reed National Military Medical Center)—his research focused on central nervous system decompression sickness and air embolism and, later, on the inflammatory and immune mechanisms in acute brain ischemia.

In 1983, Hallenbeck was appointed chief of the Navy's neurology training program at NNMC. From 1983 to 1991, he served as professor of neurology and physiology at the Uniformed Services University of the Health Sciences, also holding roles as vice chairman and chairman for research in its Neurology Department.

In 1991, he was recruited to lead the newly created Stroke Branch in NINDS Division of Intramural Research, where he served as chief until 2018.

Upon arriving at NINDS, NNMC then created the "Hallenbeck Award," annually recognizing an outstanding graduating neurology resident for their dedication and excellence in clinical neurology, research and professionalism.

Under Hallenbeck's leadership, the NINDS Stroke Branch grew into a world-class translational stroke research enterprise. He cultivated a multidisciplinary research team focused on translating promising innovations into clinical trials, while creating an atmosphere that encouraged team members to inquire and learn about all aspects of stroke research, including those outside of their primary expertise.

In 1999, with the addition of Dr. Steven Warach to the team, the Stroke Branch developed an acute stroke care program at Suburban Hospital in Bethesda, Md. Later, the program expanded to Washington Hospital Center in Washington, DC. This A-rated program produced unique research opportunities and has effectively recruited patients to multi-level trials. Additionally, this work established the critical role of imaging biomarkers for managing clinical decisions associated with acute stroke. The program has had an important impact on the quality of stroke care.

Hallenbeck authored or co-authored more than 200 peer-reviewed publications and was recognized all over the world for his knowledge and experience. Throughout his career, he received numerous prestigious awards including the American Stroke Association's highest honor, the Thomas Willis Award. He also received the Stover-Link Award, the Albert Behnke Award, the Mihara Cerebrovascular Disorder Research Prize, as well as several DHHS Special Act or Service Awards and three NIH Director's Awards.

In a 2011 interview with Medscape for the Thomas Willis Award, Hallenbeck shared, "Life is always better if you choose to do something that you can do fairly well, rather than to struggle with what you do or just be average at what you do," he said. "The other important thing is to be able to tell the difference. You need to know when you really like to do something and have some promise for that line of work. I'm happy with the choice I made. I'm in a field that is right for me."

NIH-Funded Researchers Engineer Promising New Drug for Pain

A research team funded by NIH has developed a medication that shows promise in treating acute and chronic pain. The drug, known as VIP36, targets the body's cannabinoid receptor type 1 (CB1), a critical pain sensation pathway. The drug was found to be effective in three different animal models for pain and does not appear to cause the harmful side effects that have frustrated other efforts to target CB1.

These results enhance understanding of how to design safer and more effective drugs targeting cannabinoid receptors and are an important step toward developing novel, non-addictive treatments for pain.

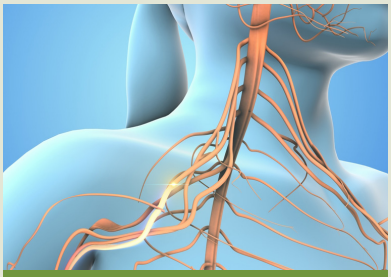


IMAGE: JITENDRAJADHAV/SHUTTERSTOCK

CB1 receptors can be found throughout the body and are particularly dense in the brain's pain circuitry. They have long been considered a potential target for non-opioid-based pain treatment; however, previous attempts to target this pathway have been met with two challenges. First, repeated exposure to a drug leads to tolerance that limits its efficacy. Second, the dose required to reduce pain in the periphery tends to be high enough for the drug to make its way into the central nervous system. In humans, this can cause unwanted changes in mood, cognition or emotional state.

To overcome these issues, researchers leveraged computer modeling of the CB1 receptor to design molecules that better interact with CB1, much like a key fitting into a lock. The newly designed drug, VIP36, is more "peripherally restricted" compared to previous drugs, meaning that much less of it leaks into the central nervous system where it can cause unwanted side effects. VIP36 also interacts with CB1 differently than treatments tested previously and in a way that reduces tolerance.

CB1 is part of a wide-ranging class of receptors known as G-protein-coupled receptors, which are involved in countless functions throughout the body including smell, vision, mood regulation, immune system responses, autonomic nervous system responses such as blood pressure and heart rate, and growth and metastasis of some tumors. In addition to their implications in pain care, the findings of this study could also help spur the design of other drugs that target similar receptors involved in other conditions.

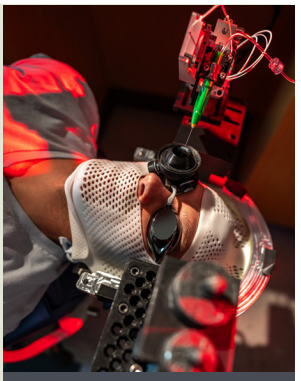
This research was funded by NIH's Helping to End Addiction Long-term® Initiative, or NIH HEAL Initiative®, an NIH-wide effort that seeks to speed scientific solutions to the overdose epidemic, including opioid and stimulant use disorders, and the crisis of chronic pain.

Study Shows Promise for Retinal Surgery Robot

When even the most highly trained surgeons perform procedures on the retina—one of the smallest, most delicate parts of the human body—the stakes are high. Surgeons must account for patients' breathing, snoring and eye movements, along with their own involuntary hand tremors, while they work on a layer of cells less than a millimeter thick.

That's why researchers at the University of Utah's John A. Moran Eye Center and the John and Marcia Price College of Engineering have collaborated to create a new robotic surgery device that aims to give surgeons "superhuman" hands.

The robot itself is extremely precise, executing movements as small as 1 micrometer (smaller than a single human cell). It is mounted directly to the patient's head using a helmet, such that subtle (and sometimes not so subtle) movements of the patient's head are compensated for, keeping the eye quite still from the perspective of the robot. The robot also scales down the surgeon's movements, measured using a handheld robotic device known as a haptic interface, to the much smaller surgical site within the eye, compensating for hand tremors along the way.

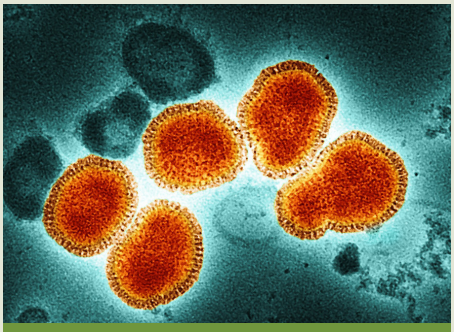


JOHN A. MORAN EYE CENTER, UNIVERSITY OF UTAH

In the experiments described in the study, the surgeons achieved higher success rates while using the surgical robot device to perform subretinal injections while also avoiding ophthalmic complications.

While still in the testing stages, the device aims to improve outcomes for patients and support cutting-edge procedures, including the delivery of gene therapies for inherited retinal diseases.

Influenza A Adapts Shape in Response to Environmental Pressures



Colorized transmission electron micrograph of influenza A virus particles isolated from a patient sample and then propagated in cell culture. Influenza A can infect humans and animals. This image features the H3N2 influenza strain. IMAGE: NIAID

Influenza A virus particles strategically adapt their shape—to become either spheres or larger filaments—to favor their ability to infect cells depending on environmental conditions, according to a new NIH study. This previously unrecognized response could help explain how influenza A and other viruses persist in populations, evade immune responses and acquire adaptive mutations, the researchers explain in a new study published in *Nature Microbiology.*

The study, led by intramural researchers at NIAID, was designed to determine why many influenza A virus particles exist as filaments. The filament shape requires more energy to form than a sphere and its abundance has been previously unexplained. To find the answer, they developed a way to observe and measure real-time influenza A virus structure during formation.

The researchers found:

- Influenza A viruses rapidly adjust their shape when placed in conditions that reduce infection efficiency, such as the presence of antiviral antibodies or host incompatibility.
- The shape of the A virus is dynamic and impacted by its environment, rather than being fixed by strain, as commonly believed.
- The study assessed 16 different virus-cell combinations that resulted in predictable shape trends.

Prior experiments by the research team showed that influenza A virus filaments can resist inactivation by antibodies, and the team is working to understand exactly how antibodies influence shape and infection efficiency. They also anticipate learning how viral mutations affect the shape of the virus.

Many other viruses—such as measles, Ebola, Nipah, Hendra and respiratory syncytial virus (RSV)—also incorporate a mixed-shape infection strategy.

Astronauts Visit Lab, Patients at Clinical Center

PHOTOS: MARIA MASLENNIKOV

NASA astronaut Dr. Michael Barratt, a member of Expedition 71, visited the NIH Clinical Center's Rehabilitation Medicine Department.

While visiting the Neurorehabilitation and Biomechanics (NAB) Research Lab, he tested an exoskeleton intended for assistance and exercise applications. The exoskeleton was originally designed for children with cerebral palsy by NAB researchers.

After this visit, Barratt joined fellow NASA astronauts Barry Wilmore, Matthew Dominick and Jeanette Epps to meet with pediatric patients at the Clinical Center Pediatric Unit and at The Children's Inn.