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FAR BEYOND BADGING

DPSAC Staff Appreciated for Service During Pandemic

BY CARLA GARNETT

At around 11 p.m. on Christmas Eve, Alex Salah was preparing to turn in for the night when he got an email alert from the Center for Information Technology. Something was offline. As chief of the Access Control Branch in the Division of Personnel Security and Access Control (DPSAC) since its inception, Salah initially wasn't overly concerned. In his experience, these occasional glitches usually resolve themselves fairly quickly.

But by 5 a.m. Christmas Day, Salah had received dozens more CIT notifications that something was wrong. The crowning blow was an email from NIH Police saying they couldn't get into several doors.

"That's when I logged into the system and I knew we had some major, major problems," Salah recalled. "I then had to call my team and try to figure out what's going on."

What was going on was a large partial outage of the access control system, with multiple sites denying entry to legitimate cardkey holders. Salah activated the continuity of operations plan and his team, which consists of his deputy William Higdon and Greg Sehrt, senior system engineer. That's how Salah and his DPSAC staff ended up spending Christmas 2021 at 95 NIH locations in Bethesda, Fishers Lane, Rockledge and Baltimore, manually rebooting each site.

More than 24 hours—and the entirety of the holiday—later, Salah's 3-person team (working with the Office of Research Facilities' door team, Xpect Solutions, other contract staff and police) resolved the problem, and then set about finding its cause.

ORS Director Colleen McGowan (l) and NIH Acting Principal Deputy Director Dr. Tara Schwetz (r) recently thanked DPSAC leaders and team for extraordinary service over the last 2+ years.

PHOTO: CHIA-CHI CHARLIE CHANG

Such dedicated service and sacrifice by

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Beware of wildlife limping. See story. p. 12

ALSO THIS ISSUE

ADOPTED FOODWAYS AND HEALTH

Researchers Discuss Dietary Acculturation

BY AMBER SNYDER

Trillions of microorganisms live on our skin and inside our bodies—a community known as the microbiome. Most of these organisms (bacteria, archaea, fungi, protozoa and viruses) reside in our lower digestive tract.

Dr. Justin Sonnenburg

Our gut microbiome (GMB) plays a large role in gut health and can also affect metabolism, the immune system, the central nervous system and beyond. Each person's GMB is unique, determined by a mixture of genetics,

SEE **MICROBIOME**, PAGE 4

A BUFFET BOUQUET?

Vosshall's Research Reveals Some People Really Are Mosquito Magnets

BY ERIC BOCK

No, you're not imagining it. You might really be a "mosquito magnet." And the smell of your skin is the reason, said Dr. Leslie Vosshall during a recent NIH Director's Lecture in Lipsett Amphitheater.

Dr. Leslie Vosshall

PHOTO: DIANA GOMEZ

"There's nothing that we can do about any of this," said Vosshall, the Howard Hughes Medical Institute vice president and chief scientific officer and Robin Chemers Neustein professor and head of the

SEE **MOSQUITO**, PAGE 8

Report Covid-19 Home Test Results Through New NIH Website

Reporting a positive or negative test result just became easier through a new website from NIH, MakeMyTestCount.org. Developed through NIH's Rapid Acceleration of Diagnostics (RADx®) Tech program, the new website allows users to anonymously report the results of any brand of at-home Covid-19 test.

Covid-19 testing remains an essential tool as the United States heads into the holiday season and people navigate respiratory viruses. While taking a rapid Covid-19 test has become commonplace, test results are not often reported. Covid-19 test results provide valuable data that public health departments can use to assess the needs and modify the responses in the local community, the state or the nation.

Lab tests have a well-established technology system for sharing test results. RADx Tech has been working on a system to standardize test reporting for at-home tests in a secure manner. The MakeMyTestCount.org website is built on this system for logging test results.

Journal Posts Article on Origin of NIH Grants

An article detailing the birth of NIH's Extramural Research Program, which accounts for more than 84% of the agency's annual budget, was recently published by the online journal *Hektoen International*. In "Origins of NIH Medical Research Grants," author Dr. Edward Tabor, a former associate director at the National Cancer Institute, describes how and why NIH began funding biomedical science conducted outside the organization, and formation of the earliest peer review system.

Dr. Edward Tabor

Hektoen International was founded in 2008 by the nonprofit Hektoen Institute of Medicine with the goal of "bringing culture into medicine and exposing health care professionals to art, ethics, literature, history, anthropology, literature, philosophy, religion and sociology," according to the journal's website. Readers include physicians, nurses, administrators and pharmacists in most countries of the world, primarily the United States, England and Australia, and also other parts of Europe, Russia, Asia and Africa.

Tabor, who formerly served as head of the Biological Carcinogenesis Program in NCI's Division of Cancer Etiology, is a scientist and author with more than 300 publications on viral hepatitis, liver cancer, pharmaceutical regulatory affairs and medical history.

To read the article, visit https://bit.ly/3gLe3Lh.

A grateful Caesar Sant plays violin at the Clinical Center; at right, he performs with former NIH DIrector Dr. Francis Collins.

PHOTOS: DANA TALESNIK

Teen Returns to Clinical Center to Play Thanksgiving Concert

Caesar Sant, age 14, can say thank you in many languages, but his preferred language is music.

Sant expressed his gratitude by performing on Nov. 21 in the Clinical Center atrium, at times accompanied by former NIH Director Dr. Francis Collins on guitar and Robert Masi, an NCI postbac fellow, on piano.

Sant returned to NIH in mid-November for his one-year checkup, following up on his bone marrow transplant last fall to treat sickle cell anemia.

Since the transplant, thanks to marrow donated by his younger sister Helen, Caesar's body is now making its own healthy blood cells. After years of chronic, excruciating pain and an early childhood marked by several strokes, Caesar is now cured and getting stronger every day.

The emotional concert—attended by dozens of NIH staff, including the clinical team who treated Caesar and Children's Inn staff, patients and a growing number of passersby—featured several classical pieces including *Ode to Joy, Amazing Grace*, the theme from *Schindler's List* and a Bach sonata.

"It's impossible to repay NIH for all you have done," said Dr. Lucas Sant, Caesar's father. Caesar, who also performed last Thanksgiving just weeks after the transplant, plans to make the Thanksgiving concert at NIH an annual tradition.—**Dana Talesnik**

ORF Releases New Maintenance Request System

The Office of Research Facilities (ORF) recently released a new and improved maintenance request process.

This change affects all NIH staff on the Bethesda, Poolesville, Ft. Detrick, Research Triangle Park and Rocky Mountain Lab campuses and leased facilities in the Durham, Baltimore, and DC-Metro areas that currently use the maintenance request process.

The user interface when submitting a maintenance request will change. Existing maintenance request numbers created in the legacy system will be migrated into the new software. There is no need to re-submit previously submitted requests. To make a request, visit https://58000.nih.gov or call 301-435-8000.

Donate Use-or-Lose to the Leave Bank by Dec. 31

Put your extra leave to use, instead of forfeiting it. Donate your use-or-lose annual leave to the NIH Leave Bank by Dec. 31, 2022, via ITAS. In 2021, employees lost an estimated $9.7 million in annual leave. When you donate to the Leave Bank, you help a co-worker in need.

To donate, log in to https://itas.nih.gov. On the tool bar, select "Donate to Leave Bank." Enter the type of leave (annual or restored annual), then the number of hours you wish to donate, and select "OK."

For details, visit https://hr.nih.gov/leavebank.

For questions, call (301) 443-8393 or email LeaveBank@od.nih.gov.

MAKING HISTORY

NIEHS Trainee Named 2022 Astronaut Scholar

Tanae Lewis, a 2021-2022 trainee in the Scholars Connect Program (NSCP) at the National Institute of Environmental Health Sciences (NIEHS), recently made history after being named a 2022 Astronaut Scholar—one of just 68 across the nation.

Tanae Lewis, recent NIEHS Scholars Connect Program trainee

PHOTO: STEVE MCCAW/NIEHS

The scholarship was created to ensure that the United States maintains its leadership in science and technology by supporting the most promising science, technology, engineering and math (STEM) college students.

Lewis, a senior chemistry student at North Carolina Agricultural and Technical State University (NC A&T), is the university's first Barry Goldwater Scholar to also be named an Astronaut Scholar, and the first college student from a historically Black college or university (HBCU) to achieve this dual recognition. The Goldwater Foundation Awards select college sophomores and juniors who intend to pursue research careers in the natural sciences, mathematics and engineering.

Lewis completed a year-long biomedical research internship at NIEHS, studying how the disruption of RNA processing pathways can lead to neurodevelopmental disease.

Kathleen Bostick (l) of Spelman College, Lewis (c) and Sarai Rankin of Morgan State University at the Astronaut Scholars Innovators Gala this past summer

PHOTO COURTESY TANAE LEWIS

As an Astronaut Scholar, Lewis will receive a $15,000 scholarship, a paid trip to Orlando to attend the annual scholarship's Innovators Week and Gala and lifelong engagement with astronauts, researchers, innovators and alumni scholars.

"The NIEHS Scholars Connect Program that Tanae Lewis took part in last year was developed to enhance the training and mentoring of our future scientific leaders," said NIEHS scientific director Dr. Darryl Zeldin. "Tanae's selection as an astronaut scholar not only speaks to the success of the program but also to the hard work and dedication of her outstanding mentors."

Lewis's NIEHS mentors are Dr. Robin Stanley, who leads the nucleolar integrity group, and postdoctoral fellow Dr. Cassandra Hayne.

"Cassandra and I are super proud of Tanae and all her accomplishments," Stanley said. "Due to Covid restrictions, Tanae's Scholars Connect experience was virtual, but despite this, she persevered and was able to accomplish quite a lot."

"I am truly grateful for the experience and opportunity to work at the National Institute of Environmental Health Sciences in Dr. Stanley's lab mentored by Dr. Hayne," Lewis said. "My research experience was outstanding, to say the least. I learned a lot in this lab and the work prepared and taught me how to think like, and eventually become, a great scientist."

Lewis keeps busy investigating neurodegenerative disorders and hopes to one day research new treatments and technologies for Alzheimer's disease.

She also is a newly published research scholar and contributed to a review article that was posted in the September/October issue of *WIREs RNA*.

"Using new advancements in the prediction of protein structure, we propose a structural model of the human tRNA splicing endonuclease complex," Lewis and coauthors wrote.

Lewis, Hayne and Stanley are researching a neurodegenerative disease called pontocerebellar hypoplasia, which is characterized by abnormal prenatal brain development.

The team explored mutations of the proteins involved in transfer RNA processing and how such defects can lead to the condition.

During her NSCP training, Lewis learned to use cryogenic-electron microscopy, which enables 3D visualization of protein structures.

The Astronaut Scholarship was created in 1984 by the surviving Mercury 7 astronauts. The program provides academic scholarships to second- and third-year STEM students who are intent on pursuing research or advancing their fields upon graduation.

"Dr. Bernard Harris broke the ceiling by being the first Black American to perform a spacewalk and is helping ensure that all students—especially Black Americans—have access to high-quality STEM education," said Lewis. "I can contribute to the diversity of the biomedical sciences profession by creating a unique voice and perspective while improving an environment that invites more underrepresented minorities to work in this field." R

ON THE COVER: *A mockingbird feasts on berries outside of Bldg. 6 on NIH's Bethesda campus.*

IMAGE: DUSTIN HAYS

The NIH Record

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Sickle Cell Study Recruits

Sickle cell disease (SCD) is an inherited blood disorder that interferes with the delivery of oxygen to the tissues. In a research study at NHLBI, investigators are exploring near-infrared spectroscopy (NIRS) technologies in measuring oxygen levels, blood flow and the make-up of skin and muscle in people with SCD. Contact the Clinical Center Office of Patient Recruitment at 866-444-2214 (TTY users dial 711) or ccopr@nih.gov. Refer to study #000844-H. Online: bit.ly/3tLVtp9

Microbiome

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environment, medication use and diet.

Dietary changes can affect the composition of our GMB. This knowledge prompted a question for several researchers in the NIH Microbiome, Diet, and Health Interrelationships and Nutrition and Health Disparities Implementation working groups. They presented a joint lecture, "The Gut Microbiome and Dietary Acculturation Among U.S. Immigrants."

How do dietary changes from immigration affect the microbiome? Dietary acculturation is the process that occurs when members of a minority group adopt the eating patterns or food choices of their host country. For individuals who move to live in the U.S., that may involve adopting a more "Westernized" diet, i.e., consuming foods high in sugars and fats and low in fiber.

Western diets, said Dr. Justin Sonnenburg of Stanford University, have "very different metabolic outcomes than a more plant-based diet."

One way to study how our GMBs have changed is to learn what they used to look like.

Sonnenburg accomplished this by studying samples obtained from the Hadza people, a hunter-gatherer community that is one of the last such communities in Africa. He found that the Hadza gut harbors microbial species that are both more diverse and distinct when compared to people from industrialized communities. One notable difference is that the Hadza have many *Prevotella* species, a group of bacteria that have been associated with high-fiber diets. Alternatively, industrialized guts are populated with more *Bacteroides* species. Some microbe types, including the *Prevotella*, also cycled seasonally in the Hadza, seeming to coincide with the seasonal availability of certain plants.

Dr. Robert Kaplan

Interestingly, other researchers have found that the microbial diversity in non-industrialized peoples is very similar to that found in the feces of ancient (paleo) humans. Industrialization seems to coincide with a general decline in microbial diversity, as well as an increase in chronic inflammatory diseases.

"Our microbial identity has changed," Sonnenburg said.

But how do peoples' microbial identities change when they move to new places and alter their eating habits? To answer this question, researchers studied U.S. residents of Hispanic/Latino descent. People in this group make up 19% of the U.S. population and are widespread across the nation. About four in five study participants were born in Latin America. Diet varies from country to country, but in general, Hispanic/Latino individuals following the diet traditions of Latin America generally eat a more fiber-rich diet, with staples such as beans, fruits and vegetables.

Dr. Robert Kaplan, a professor at the Albert Einstein College of Medicine, found that duration of time spent in this country is a leading correlate among Latinos of gut microbiome diversity and prevalence of particular bacteria, such as fiber-utilizing *Prevotella*. Kaplan's findings were informed by a cohort study of 16,000 Latin American adults across the U.S.

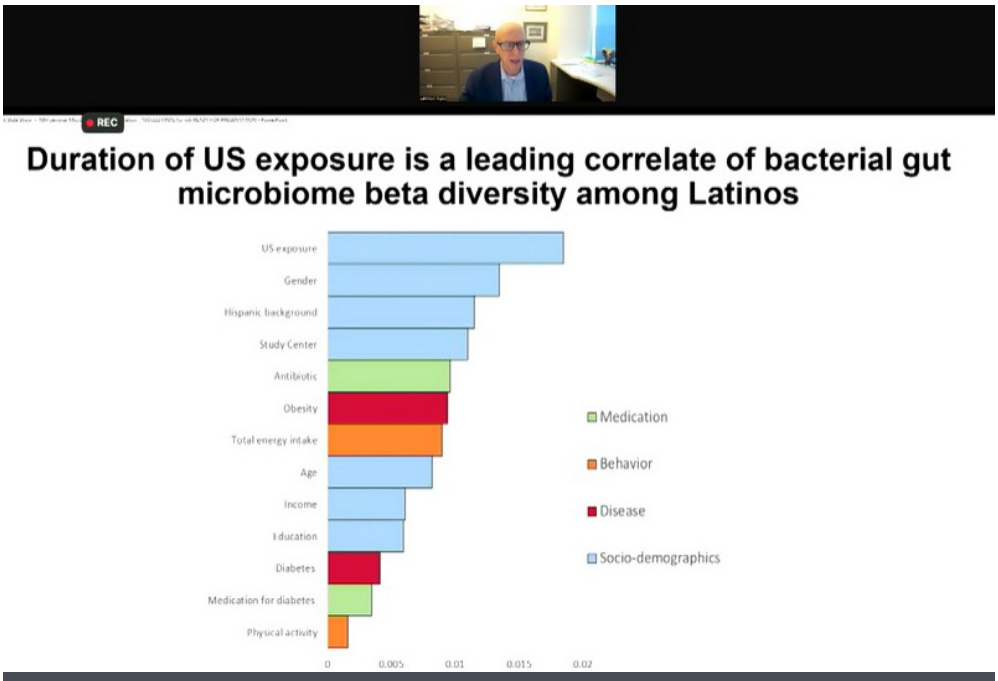
He categorized individuals into national background groups and evaluated their metabolic risk factors: incidence of conditions like hypertension, dyslipidemia, obesity and diabetes.

Interestingly, as English language use rose among U.S. Latinos, so did their body mass index (BMI). This trend held true even when Kaplan accounted for education level. Participants also provided details about their diets and self-assessed their dietary identity as Hispanic or American.

Results showed "a great degree of diversity" in the healthfulness of participants' diets, Kaplan noted. He was able to identify three groups of dietary patterns: burgers-fries-soft drinks, fish-salad-whole grains and white rice-beans-red meat. The latter group is reflective of a traditionally Hispanic diet, and the first (Westernized or American-style) diet group is associated with fewer fiber-rich foods. Many individuals in the cohort study reported eating higher proportions of American foods than Hispanic foods as they spent more time in the U.S.

Kaplan and his team measured multiple variables and determined their role in GMB diversity and composition; time living in U.S. was a leading factor. Also, researchers learned that microbial species abundance varied by region of birth as well as diet.

Prevotella, for example, a genus of bacteria that is associated with high-fiber diets, was much less abundant in individuals who were born in the U.S. compared to



Out of 13 factors measured, time spent living in the US was the leading correlate for GMB diversity in Latinos, Kaplan found.

people born in Latin America. Conversely, in folks born in the U.S. as well as people who relocated here from Latin America at a young age, the diets were higher in fat and protein and the gut was enriched with genus *Bacteroides*.

Dr. Brandilyn Peters-Samuelson

For individuals who were born in the U.S, national background did not seem to have an effect on microbial genus abundance. This suggests that Americans of Puerto Rican, Mexican and other Latino heritage all may be susceptible to changes in gut microbiome if they adapt a more Americanized lifestyle.

"The *Prevotella* to *Bacteroides* ratio was higher for those who ate more whole grains and vegetables, and lower for those who ate more meats and trans fats," Kaplan summarized.

Birthplace and age of relocation also influenced this ratio: Individuals born in Latin America who relocated later in life had a much higher *Prevotella* to *Bacteroides* ratio than someone born in mainland U.S. or who relocated in childhood.

"Birthplace and migration do have demonstrable differences in the gut microbiome that go beyond dietary preferences," Kaplan's study found. "Birthplace and acculturation have lasting effects."

Differences in GMB are also observable in other immigrant groups.

Dr. Brandilyn Peters-Samuelson, an assistant professor at Albert Einstein School of Medicine, worked with a different cohort study that follows participants over time and studies incidence of cancer and other conditions. This research involved Asian, Black, Hispanic and White groups.

The two largest groups in the cohort—White U.S.-born people and foreign-born Korean individuals—showed a significant separation in GMB communities. Peters-Samuelson also compared the *Bacteroides* to *Prevotella* ratio in all groups, and determined that it was highest in the White, U.S.-born group.

In addition, Peters-Samuelson developed a dietary acculturation index that she graphed against the GMB diversity of the study participants. Higher dietary acculturation index in foreign-born Korean individuals was "marginally associated with a decrease in GMB diversity," although it was not statistically significant, she found.

Findings were similar for the foreign-born Hispanic group. One example of this diversity loss can be seen in the abundance of bacterial species *Bacteroides plebius*, which is prevalent in many Asian communities because the microbe is especially adept at digesting the complex carbohydrates in seaweed. The prevalence of *B. plebius* in foreign-born Koreans in the study decreased as dietary acculturation index increased. She observed similar patterns in several microbial species common to foreign-born Hispanics.

Researchers noted that there is much to learn still about the implications and process of dietary acculturation. Not all changes are deleterious, but those that are may contribute to conditions such as obesity, diabetes and cardiovascular disease.

Looking forward, Peters-Samuelson said, she wants to define and encourage "healthy" dietary acculturation. R

Researchers, clinicians and FDA and patient representatives met virtually with NIAMS leadership to discuss where and how the institute could facilitate progress in regenerative medicine for cartilage preservation and restoration in knee osteoarthritis.

NIAMS Hosts Roundtable on Regenerative Medicine in Knee OA

A recent NIAMS roundtable discussion focused on regenerative medicine approaches for cartilage preservation and restoration in knee osteoarthritis (OA). Researchers, clinicians and FDA and patient representatives met virtually with NIAMS leadership to discuss where and how the institute could facilitate progress in the field.

In OA, cartilage (which covers the ends of the bones in a joint) deteriorates. Over the past decade, investigators have explored a variety of cartilage-regeneration approaches for people with knee OA. Techniques have focused on healing minor structural cartilage defects from injury (which increase OA risk) and restoring cartilage in people with chronic OA that has taken decades to progress.

Despite the high prevalence of knee OA, there are currently no FDA-approved medicines that can repair cartilage defects or alter the course of the disease. However, regenerative medicine has shown promise for restoring the health of cells, tissues and organs.

Roundtable participants reviewed the evidence keyed to safety and efficacy of regenerative therapies for knee OA; discussed emerging therapeutic approaches; and outlined the main challenges and gaps impeding clinical translations of these emerging opportunities.

Read the meeting agenda and watch the archived recording at https://bit.ly/3Fdobpy.

DPSAC staff gather in person and virtually, as NIH leaders appreciate outstanding service over the last few years.

PHOTO: CHIA-CHI CHARLIE CHANG

DPSAC

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all of DPSAC were formally acknowledged Nov. 10 during the latest stop on NIH leadership's Gratitude Tour. The hybrid event—held on site in a Bldg. 31 conference room and broadcast live to remote locations in Baltimore and Rocky Mountain Laboratories in Montana—celebrated achievements well beyond DPSAC's badge issuance function.

In 2020, during the height of the pandemic, the DPSAC Help Desk handled 19,721 phone calls and responded to 46,902 email inquiries.

In addition, despite Covid-19's multi-dimensional impact on operations, DPSAC maintained a high level of output—in many cases outpacing pre-pandemic figures.

Consider the electronic background checks known as e-QIPs. From January to June 2019, DPSAC processed 4,028 eQIPs. Even with static staffing levels, DPSAC processed 5,271 eQIPs from January to June 2022, representing a more than 30% increase in output.

From March to July 2022, DPSAC processed more than 4,305 e-QIPs. During this same time, the combined output of all HHS operating divisions was 16,999. That means one in four eQIPs processed by the department came from NIH.

Discussing their experiences working in DPSAC throughout pandemic conditions are Alex Salah (l), Jonathan Jaffe (c) and Tara Patti.

With little to no loss in service, telework was instituted for 70% of DPSAC staff to reduce the risk of Covid-19 transmission. DPSAC was also able to provide concierge onboarding service to VIPs during the pandemic's height.

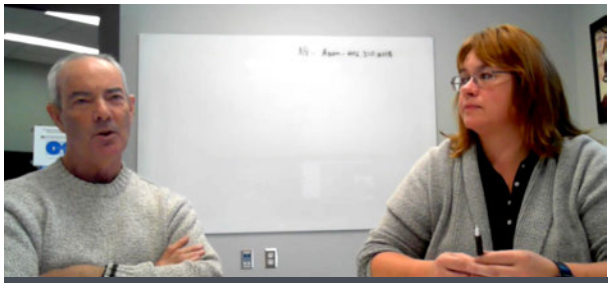
To address travel restrictions during the pandemic and the reality of a geographically dispersed population, DPSAC implemented an alternative method for collecting fingerprints remotely from applicants across 1,300 locations in the continental United States.

To date, this has resulted in more than 4,800 fingerprint adjudications, greatly enhancing NIH's ability to onboard applicants. DPSAC also negotiated with the software vendor to receive a reduced price per transmission, resulting in a nearly 53% discount off the standard cost.

In the first six months of the pandemic, DPSAC in conjunction with CIT and HHS executed an unprecedented solution that allowed remote extension of expiring PIV cards for more than 100 critical NIH staffers—many of whom were in clinical settings.

DPSAC was also responsible for the highly sensitive, but crucial function of denying on-site access to employees who tested positive for Covid-19—a job that had to be handled confidentially, definitively and diplomatically.

"Thank you for everything you all have done and are continuing to do to keep everyone at NIH safe and secure and to help get people onboarded in a timely way," said Dr. Tara Schwetz, NIH acting principal deputy director. "If not for the work that you all do, we wouldn't have had the ability to



Joining the event from RML facilities in Montana are Bill Cullen and Kris Schmitt.

DPSAC's Barbara McMullen (l) and Dahlia Maglo

DPSAC's Felicia Walker (l), T'Nae Brown and Patrick Zapata discuss the creative problem-solving and resiliency shown by staff under unusual circumstances.

hire for critical positions and to do so in as quick and efficient way as possible."

Joining Schwetz to congratulate DPSAC staff and contractors were Dr. Alfred Johnson, NIH deputy director for management, and Colleen McGowan, director of the Office of Research Services, which oversees DPSAC.

Bill Cullen, associate director for security and emergency response, participated virtually, reporting on screen from RML facilities, which had just experienced a blizzard. He offered an overview of DPSAC's origin in 2006, following clearance requirements issued by the Department of Homeland Security for all federal agency workforces.

"This was a complex and labor-intensive undertaking requiring reconciliation of records across three different systems," said Johnson, who was just assuming the ORS director post when DPSAC was being established 16 years ago.

During the hour-long session, several DPSAC leaders described the various challenges successfully negotiated by devoted team members, who often had to call on every ounce of creative problem-solving and troubleshooting skills.

"Being on the frontlines is not an easy thing," McGowan acknowledged. "You deal with people who are thankful [and] you deal with people who aren't so thankful, and you're here no matter what, to provide that service with a lot of integrity and a lot of kindness along the way. So, thank you for that."

McGowan visits with Shanice Thomas (l) and Anton Jenkins.

T'Nae Brown, DPSAC director, and her deputy, Felicia Walker, also expressed appreciation to their team for rising to the multitude of challenges the group faced under historic and stressful conditions. Each talked about relying on their DPSAC family for everything from providing continuous pandemic updates and enough PPE supplies to brainstorming innovative solutions with contract support staffers.

"I also want to thank Colleen, Bill, T'Nae and Felicia for your exceptional leadership," concluded Schwetz, "and thank you for all the essential work that you do here at NIH."

Human Genetic Cell Repository Celebrates 50 Years

BY RACHEL CROWLEY

The year 2022 marked 50 years since the creation of the NIGMS Human Genetic Cell Repository (HGCR) at the Coriell Institute for Medical Research.

Former NIGMS Deputy Director Dr. Judith H. Greenberg spoke at the celebration of this hallmark anniversary, hosted by Coriell.

"When the repository was launched in 1972," she said, "it was not only a visionary idea to build a repository that would represent a full range of genetic disorders, but it was also an altruistic idea because it was designed from the start to address the research missions of many of the NIH institutes."

HGCR collects cell lines and DNA samples with a focus on those from people with rare, heritable diseases. The collection was first released in 1973 as a paper catalog with only a few genetic disorders and chromosomal abnormalities represented in its small number of cell lines.

Now, the collection boasts many thousands of cell lines and DNA samples that represent human inherited genetic disorders, healthy controls, human amniotic fluid cultures, fibroblasts with chromosomal abnormalities, cell lines from geographically diverse populations and much more—all available online. In fact, the collection includes more than a thousand different rare genetic diseases, some of which are the only samples in the world available to scientists studying them.

A sample donation from someone with a rare disease opens the door for researchers not only to study the specific disease but also to learn more about biology, genetics and health in general.

One example of an unexpected discovery is the development of a vaccine against the Ebola virus. Researchers studying samples in the NIGMS HGCR collection from people affected by Niemann-Pick Type C (NPC), a rare and fatal neurological disorder, determined that the protein mutated in a type of NPC is essential for the Ebola virus to enter cells. Researchers were able to use that new understanding to develop an effective vaccine.

Dr. Judith H. Greenberg

Maintaining a scientifically useful and relevant repository over the course of 50 years has required foresight and adaptability in a world of ever-changing science and technology. This has meant continuing to grow the collection itself, adding newer samples and product types. This growth can help address a broader range of rare diseases and better represent human ethnic diversity.

While the repository started as a home to just cell lines, it now includes much more than that—even induced pluripotent stem cells (iPSCs) and high molecular weight DNA. iPSCs are powerful cell lines that allow scientists to grow nearly any type of cell in a dish and accelerate research in many areas. High molecular weight DNA allows scientists to better characterize structural variation in regions of the genome that may be more challenging to study with other approaches.

As the Coriell website notes, "When one donates to the NIGMS HGCR collection, it's impossible to know all of the ways that a contribution may be used to improve human health."

Find the full anniversary celebration online at https://bit.ly/3XTPwVc. For more information about HGCR, visit https://bit.ly/3Vjg5kU.

Mosquito

CONTINUED FROM PAGE 1

Laboratory of Neurogenetics and Behavior at Rockefeller University.

Each year, *Aedes aegypti* mosquitoes infect an estimated 400 million humans with the dengue virus while they get a blood meal. In addition to dengue, they transmit viruses such as yellow fever, Zika virus, and chikungunya.

Another species of mosquitoes, *Anopheles*, account for 500,000 deaths per year by spreading the malaria parasite. They require non-existent winters, standing water and close proximity to a dense human population. As the climate warms, northern and temperate regions are becoming "fantastic habitats" for the insect.

Mosquitoes are one of the few insects to evolve a taste for human blood, an "incredibly protein-rich meal." Only female mosquitoes have the desire to bite humans because the female bugs require a blood meal to develop eggs, Vosshall said. In addition to cells, protein and lipid, blood contains glucose, sodium chloride, sodium bicarbonate and adenosine triphosphate, or ATP for short, which is a compound that provides energy to cells.

"ATP is one of the most exciting tastes that an insect ever encounters," she noted. "It triggers feeding. They love the taste of it."

In addition to blood, both male and female mosquitoes drink plant floral nectar for energy. Nectar contains sucrose, fructose and glucose. Females can tell the difference between nectar and blood even though they both contain glucose.

Aedes aegypti mosquito. Research shows she may be attracted to your skin's smell.

"Mosquitoes have two separate tongues—a tongue for blood and a tongue for sugar," she said. One is the stylet and the other is the labium. They also have two stomachs—the crop, which holds sugar, and the midgut, which holds blood. If sugar enters through the midgut, the reproduction process is interrupted.

Female mosquitoes' syringe-like stylet contains 25 neurons. "Half of these cells get really excited by the taste of blood," Vosshall said. It's not yet known what the rest do.

In one experiment, Vosshall's lab genetically modified mosquitoes so they could see what neurons in the stylet activated during feeding. Mosquitoes were fed glucose, sodium chloride, sodium bicarbonate and ATP.

Results suggested that clusters of neurons responded to only one component of blood. A whole set of cells, for example, responded only to ATP. Then, there are neurons that respond only to sodium chloride or bicarbonate. In addition, there is one group of neurons called Integrators that responds to glucose when sodium chloride or bicarbonate is also present.

"If you do not have a blood component, these Integrator cells do not get excited," she said. This mechanism ensures that the stylet does not confuse blood with nectar.

The pesky bugs are attracted to carbon dioxide, human body heat and odor. Carbon dioxide is the most potent arousal signal for mosquitoes. "A few seconds of carbon dioxide will flip them into a state of arousal for 15 minutes," Vosshall said. "It doesn't even matter if you run away. They're still excited and will keep hunting you."

There are many studies from both the lab and the field that show that certain people are more attractive than others. It's thought that odor attracts mosquitoes to certain people because everyone produces carbon dioxide.

To answer the question of who's more attractive to a mosquito, Vosshall's lab at Rockefeller held a "March Madness"-style single elimination tournament where they pit the odors of volunteers against one another. They asked volunteers to wear nylon stockings with the toes cut off on their forearm for six hours.

"It's a well-known secret in the field of chemical senses that nylon is the premier material to collect human body odor," she explained. "It's also cheap and commercially available."

They cut the worn nylon into squares and placed one into each of two traps attached to a large box containing 50 unfed mosquitoes. The lab asked match-up winners to return and submit additional odor samples. The researchers continued these match ups for the next several months. The tournament's winner—subject 33—was 144 times more attractive compared to the least attractive person, she said. The winner's attractiveness remained steady throughout the tournament.

Rockefeller University's Vosshall with NIH host for the day Dr. Paule Joseph, a Lasker Clinical Research Scholar in NIAAA

PHOTO: DIANA GOMEZ

"The property of being highly magnetic to mosquitoes was extremely consistent," she said. "Over the entire course of the study, there was never a game that subject 33 lost."

The most attractive subjects in the experiment had higher levels of carboxylic acids on their skin. The acid is produced through sebum, an oily layer that coats a person's skin. Beneficial bacteria eat the sebum and produce carboxylic acid and, as a result, an odor that smells like stinky cheese.

"Having high levels of carboxylic acids on your skin changes something about how attractive you are," Vosshall said.

It's possible that one day scientists might be able to alter the skin chemistry to make these magnets less attractive to mosquitoes, she noted. Vosshall hopes that her findings will lead to treatments that alter a mosquito's taste for blood.

"It's an important problem to figure out how these females are doing what they do and how do we stop them," she said.

Researchers Unlock Pattern of Gene Activity for ADHD

DNA double helix with data

IMAGE: NHGRI

NIH researchers have successfully identified differences in gene activity in the brains of people with attention deficit hyperactivity disorder (ADHD).

The study, led by scientists at NHGRI, found that individuals diagnosed with ADHD had differences in genes that code for known chemicals that brain cells use to communicate. Results published in Molecular Psychiatry, show how genomic differences might contribute to symptoms.

Postmortem studies are rare, due to limited donation of brain tissue, but they are invaluable in providing researchers direct experimental access to the brain. To date, this is the first study to use postmortem human brain tissue to investigate ADHD.

The researchers used a genomic technique called RNA sequencing to probe how specific genes are turned on or off, also known as gene expression. They studied two connected brain regions associated with ADHD: the caudate and the frontal cortex, regions known to be critical in controlling a person's attention.

"Multiple types of genomic studies are pointing towards the expression of the same genes," said Dr. Gustavo Sudre, associate investigator in HGRI's Social and Behavioral Research Branch, who led this study. "Interestingly, these gene-expression differences were similar to those seen in other conditions, which may reflect differences in how the brain functions, such as in autism."

Researchers found that these differences affected the expression of genes that code for neurotransmitters, chemicals that brain cells use to communicate with one another. In particular, the results revealed differences in gene expression for glutamate neurotransmitters, which are important for brain functions such as attention and learning.

ADHD affects about 1 in 10 children in the U.S. and symptoms may persist into adulthood. Individuals with ADHD may have difficulty concentrating, which can affect their ability to complete daily tasks and focus on school or work.

Researchers had previously been able to identify genes associated with ADHD but had been unable to determine how genomic differences in these genes act in the brain to contribute to symptoms, until now.

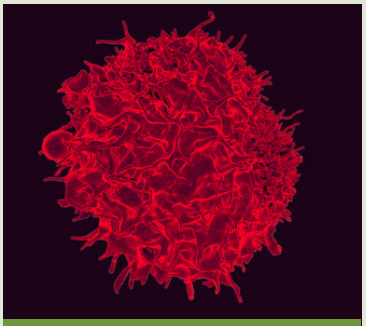
Experimental Cancer Vaccine Shows Promise

An experimental therapeutic cancer vaccine induced two distinct and desirable immune system responses that led to significant tumor regression in mice, reported investigators from NIAID.

Researchers found that intravenous (IV) administration of the vaccine boosted the number of cytotoxic T cells capable of infiltrating and attacking tumor cells and engaged the innate immune system by inducing type I interferon.

The innate immune response modified the tumor microenvironment, counteracting suppressive forces that otherwise would tamp down T-cell action. Modification of the tumor microenvironment was not seen in mice that received the vaccine via needle injection into the skin (subcutaneous administration).

Dubbed "vax-innate" by the scientific team, the approach achieves an important goal in the quest for more effective immunotherapeutic vaccines for cancer. The study demonstrates that IV vaccine delivery enables and enhances T-cell immunity by overcoming tumor-induced immunosuppressive activity.



Colorized scanning electron micrograph of a t cell lymphocyte

IMAGE: NIAID

The researchers say the candidate vaccine might also be given intravenously to people who have already received tumor-specific T cells as a therapy. They noted it also could improve tumor control by increasing the number of T cells and altering the tumor microenvironment to make them function better.

The experimental vaccine, SNAPvax, was designed by Dr. Robert Seder and colleagues at the NIAID Vaccine Research Center together with collaborators from Vaccitech North America, a clinical-stage biopharmaceutical company in Baltimore. Vaccitech announced plans to advance the SNAPvax platform for use in treating human papilloma virus-associated cancer in 2023.

NIH Launches Global Trial to Study Iron Treatment for Post-Pregnancy Anemia

NIH-funded researchers are launching a large study to evaluate a single dose of intravenous iron to treat women experiencing anemia after giving birth. The study will enroll nearly 5,000 women in Bangladesh, India, Pakistan, the Democratic Republic of Congo, Kenya, Zambia and Guatemala.

Researchers in the Global Network for Women's and Children's Health, a group of clinical sites funded by NICHD, will conduct the study. The Foundation for the NIH is providing more than $6 million in funding for the study, with contributions from a grant from the Bill and Melinda Gates Foundation.

PHOTO: LIDERINA/SHUTTERSTOCK

Participants will be randomized to receive either a single dose of intravenous iron solution between 6 and 48 hours after giving birth or a 6-week supply of oral iron supplements. According to the standard of care, both groups also will receive the vitamin folate.

Iron deficiency anemia increases sharply among individuals after birth. Symptoms include fatigue, weakness, shortness of breath, reduced cognitive abilities and depression. Anemia may also compromise a mother's ability to provide care for her baby.

Previous studies have found intravenous iron to be effective at preventing anemia in pregnancy, but it has not been studied as a treatment for anemia after pregnancy. Researchers will compare the prevalence of mild anemia, iron levels, depression scores, quality of life scores and other measures between the two groups to assess effectiveness.

After 33 Years at NIH, NIDA's Austin Retires

BY HEATHER BOERNER

When Joellen Austin (née Harper) was 12, she and her mother took a four-day bus tour from her home in western Massachusetts to Washington, D.C. She didn't return home with many mementos but she did leave with the certainty that she wanted to work in the government, where "they were making things happen for Americans."

As she prepares to retire from 34 years in public service—33 of those years at NIH, including as executive officer at three different institutes—Austin said the experience has been greater than her childhood self could have imagined.

NIDA's Joellen Austin

"I was excited to come to NIH but didn't expect I would stay here forever," she said. "Once I fell in love with NIH, where else would I ever want to go?"

Austin is the youngest of six children. Her late mother Peggy is her role model. Peggy solely supported her children on her secretary's salary and ultimately sent Joellen to college. Her mother's model of strength and perseverance despite adversity shaped the person Austin became.

After working her summer and winter breaks in grad school at the Department of the Treasury, Austin was hired as a presidential management intern at NIH. She moved up the ranks and, by 2000 when she became chief grants management officer at the National Institute of Neurological Disorders and Stroke (NINDS), she thought she might have reached the end of the professional road at NIH.

Then, "I felt like I won the lottery," she said.

Her NINDS executive officer sponsored her to go back to school full-time to the Sloan Fellows Program at Stanford University Graduate School of Business, from which she graduated in 2003.

"When you come back [from Stanford], you will be ready for the next level of management," she remembered her sponsor saying.

That turned out to be true. Within a year of her return, Austin was named acting executive officer, and eventually NINDS's official EO. Her talents for strategic problem-solving, applying her interpersonal skills to resolve conflicts and establish partnerships, turned out to be critical skills for the EO role.

Her next opportunity was as EO of the National Institute of Environmental Health Sciences (NIEHS) in North Carolina which, after four years, led her to NIDA in 2015.

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"Once I fell in love with NIH, where else would I ever want to go?"

–JOELLEN AUSTIN

• • •

Reflecting on her 34-year career, Austin said there are a handful of NIH leaders who stand out as taking a chance on her and serving as sponsors in her career growth and progression. She hopes she did the same for many others during her NIH career.

Austin is an extrovert who gains energy from her one-on-one interactions. At each institute, she said she had opportunities to help great scientists become great leaders. This led her to seek certification as an executive and leadership coach, work she looks forward to continuing after federal retirement.

She's particularly proud of how she saw the Covid-19 pandemic as an opportunity to expand transparency within NIDA, holding monthly town hall meetings alongside NIDA Director Dr. Nora Volkow. Her goal was to ensure staff knew that leadership cares as much about the NIDA mission as the health and safety of all the people at NIDA who make that mission possible.

Austin singled out her work at NIDA with Volkow as the most rewarding and impactful of her career. Volkow agreed.

"Joellen's contributions to NIDA are too many to summarize but among the most valuable was her management style, which brought clarity, fairness, transparency, accountability and efficiency to NIDA while also helping to create a culture of inclusiveness and appreciation," Volkow said. "NIDA and NIH are better for Joellen's service; we at NIDA will miss her deeply."

Looking back, Austin stressed the rewards she found in her career at NIH.

"The meaningful work at NIH is unmatched in the government," she said. "I am proud to have worked alongside all of the other incredible people who have devoted their careers and their lives to the NIH mission."

OHR Director Julie Berko (l) and NIAID Chief Technology Officer Alexander Rosenthal

NIH'ers Receive Presidential Rank Award

Two NIH'ers received the 2022 Presidential Rank Award, the highest honor the federal government can bestow upon a career civilian employee.

This year, Julie Berko, director of NIH's Office of Human Resources, and Alexander Rosenthal, chief technology officer at the National Institute of Allergy and Infectious Diseases, were among the 233 winners from 33 federal agencies.

The career senior executives and senior career employees were selected by President Joe Biden for their exceptional leadership, accomplishments and service over an extended period of time.

Winners of this award are "strong leaders, professionals and scientists who achieve results and consistently demonstrate strength, integrity, industry and a relentless commitment to excellence in public service," according to nomination guidelines.

The Civil Service Reform Act of 1978 established the Presidential Rank Awards program to recognize the long-term hard work and important contributions of dedicated civil servants in the American federal workforce.

The Office of Personnel Management administers the program and announces the awards.

NCATS Mourns Shinn, Longtime Drug Discovery Team Leader

Paul Shinn, a foundational member of the National Center for Advancing Translational Sciences (NCATS) and its Division of Preclinical Innovation (DPI), died on Nov. 17, following a traffic accident. He was 46.

Paul Shinn

As DPI's compound management group leader, Shinn worked with his team to oversee large libraries of investigational and approved drug compounds. The group provides samples of drug compounds to NCATS researchers, other NIH institutes and centers and more than 300 collaborators on six continents.

Shinn was an expert in process automation and a true practitioner in the principles of continuous improvement. He created workflows and processes to automate a wide variety of tasks and reduce dependency on manual operations, or to enable tasks that would not be feasible if done manually. These range from the development of a fully Web-based sample management ordering service that nearly every NCATS intramural scientist uses, to systems that automate operation of sample storage and retrieval systems.

Shinn and his team also developed software and processes that improved chemogenomic screening. He pioneered methods to automate the screening of drug combinations, including development of novel software used throughout the biomedical community. Many of the studies enabled by his methods yielded the primary data that led to multiple, successful clinical trials that have changed the treatment of several cancers.

"Paul's contributions to NCATS are immeasurable," said NCATS Director Dr. Joni Rutter. "As a colleague, collaborator, mentor and friend, he always was approachable, supportive, giving of his time to others and a joy to be with. His sudden loss leaves a hole within NCATS that will be impossible to fill."

Born in Burma, Shinn immigrated with his family to the United States when he was 3. He earned an undergraduate degree in biochemistry at the University of Pennsylvania, and conducted postgraduate genomics research in the laboratory of Dr. Joseph Ecker at the Salk Institute for Biological Studies.

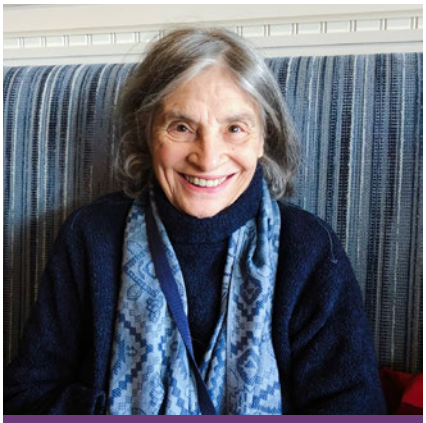
Before joining NCATS, Shinn worked at the NIH Chemical Genomics Center within the National Human Genome Research Institute. He was an author on more than 80 research papers on drug discovery and genomics.

"Paul was the definition of a translational scientist," said Sam Michael, chief of NCATS's Information Technology Resources Branch and Shinn's friend and supervisor for more than 16 years. "He was a man of many diverse talents whose work crossed multiple disciplines and who had a passion for helping anyone who asked at any time. He was an amazing scientist and an even better person, and his memory will forever be honored and cherished."

Shinn is survived by wife Angelee Mullins and two daughters.

Greenwald, Longtime NIH History Enthusiast, Is Mourned

BY MICHELE LYONS



Harriet Greenwald

"Do you need any help? I have an A.B.D. [all but dissertation] in history from Harvard and live on the NIH campus," Harriet Greenwald asked Dr. Victoria Harden during an introductory phone call in 1986. Harden, founding director of the Office of NIH History and Stetten Museum (ONHM), remembered that with that phone call, she saw a vision of an angel descending. Greenwald's offer led to her long and fruitful professional and personal relationship with ONHM.

Greenwald, 87, died Nov. 9 in New London, Conn., where she had relocated in 2016.

In 1986, Greenwald became lead editor of ONHM's publication *NIAID Intramural Contributions, 1887-1987*. [https://bit.ly/3u96pgP] Involvement in NIH's centennial celebration led to formation of the NIH Alumni Association (NIHAA), also in 1986, when Greenwald served as executive director and editor of the *NIHAA Update* newsletter.

NIHAA provided a way for staff who had retired or left to stay in contact with each other. She led the organization until it disbanded in 2007.

ONHM holds the NIHAA archives in its collections.

Greenwald also spearheaded a project to find and label objects and records all over the Bethesda and Hamilton, Mont., campuses that the ONHM is collecting. [If you find an instrument, picture or file with a sticker denoting the item as part of the historical survey, contact ONHM.]

Greenwald's last project is an ongoing effort with ONHM to document all of the residents who lived in the Public Health Service (PHS) quarters on campus since they opened in 1940. Her historical research is proving pivotal in a current joint ONHM/ORF project to specifically document the 15B quarters for historic preservation, as the building is preparing to be renovated for use by the NIH Children's Inn.

Born in Los Angeles to artist Cecilia Conn Reif and architect/movie set designer Elias "Harry" Reif, Greenwald graduated from UCLA. She came east to attend Harvard as a doctoral student in colonial American history. In 1967, she met Dr. Peter Greenwald; they would celebrate 54 years of marriage.

In 1981, Peter joined NIH to establish and become director of the Division of Cancer Prevention and Control at the National Cancer Institute. He and Harriet lived on the Bethesda campus in PHS quarters until his retirement in 2016.

"Harriet gave selflessly of her time and expertise to so many people on campus," concluded one of several NIH'ers who worked closely with Greenwald. "She used her power for good, whether providing research and program assistance to ONHM, encouraging and introducing newcomers to NIH, or loaning out her on-campus parking spot to a pregnant colleague. She took a robust interest in politics, an even more keen interest in her children and grandchildren, and was a person who managed to keep in contact with so many people without forgetting names that it was awe-inspiring. She also leaves a hole in ONHM that will never be filled."

Greenwald's survivors include husband Peter, children Rebecca, Laura and Daniel, and 10 grandchildren.

Reports of Lameness in White-Tailed Deer on Campus

BY GINGER TANSEY

Lameness is defined as the inability to properly use one or more limbs, and it's often associated with pain or injury. In wildlife, lameness can be difficult to identify, as these animals avoid close contact with humans, which impedes our ability to assess them.

Many different issues can cause lameness, from physical impediment such as muscle damage, hoof damage or healed injuries that cause scarring, to infections that affect the brain, spine, hips, knees or hooves. The only way to determine what might be causing a particular animal to be lame is by touching the patient and examining them closely.

Even without close examination, though, it's possible to perceive mechanical impairment of the gait, or 'limping', and that can be used as a general guide to identify possible causes.

On the Bethesda campus, there's a small population of white-tailed deer (*Odocoileus virginianus*), composed primarily of adult females with their offspring, and a smaller group of three or four adult to young-adult males. The males will often hang out together, or with the females, in non-mating season, and shift to solitary life during rut, when they compete with other bucks for mating.

NIH has a group of dedicated veterinarians and volunteers on campus—the Wildlife Veterinary Volunteers (WVV)—who investigate concerns with wildlife.

In January 2022, WVV had a report of a lame buck; the on-call veterinarian (Dr. Tom Thomas of the Division of Veterinary Resources, Office of Research Services) found him with a herd of female deer. Thomas assessed him and saw no visible signs of illness or injury.

PHOTO: DEVORAH GALLARDO

PHOTO: TOM THOMAS

In November 2022, there was another report of a lame buck. The on-call veterinarian (Dr. Ginger Tansey, National Eye Institute) saw him the following day and observed him alone, moving well with no signs of illness or injury. After discussion, the veterinarians agreed it was likely the same buck both times, as it was a rear-leg lameness with no visible injury or illness.

In veterinary medicine, we have old sayings handed down from the days of making farm calls. One of these is "If you can't catch the patient, it isn't that sick." We have to weigh the stress of chasing a sick animal, particularly a wild species, with the possible benefits of capturing and treating that patient. In most cases, if the patient is mobile and able to evade us, it's not worth the stress—which could potentially be fatal to the deer—and that's why we are careful to observe from a distance.

In this case, the buck appears to be mobile and moving without pain or distress; his actions are not out of the ordinary, and as one would expect of a healthy deer, he is seen in the company of other deer. Because of all these factors, ORS has not tried to capture this buck, and will continue to keep an eye on him. As long as he can move around normally, even with a limp, we don't need to attempt any treatment.

Remember if you see any injured wildlife on the NIH Bethesda campus, you can call (301) 496-5685 and report it to the nonemergency dispatcher who will contact one of the on-call veterinarians.

PHOTO: LYRIC JORGENSON