

## ODE TO JOY

### Young SCA Patient Is Pain-Free Following Transplant

BY DANA TALESNIK

“It’s such a blessing,” exclaimed Dr. Lucas Sant as he and his son Caesar walked into the Children’s Inn on a brisk, mid-March day. The two had just come from the Clinical Center where Caesar had his 6-month checkup.

Two days earlier, an unseasonable snowstorm made its way down to Memphis, where the family lives, and Caesar played in the snow for the first time. The 30-minute joyful outing was unimaginable before his treatment, when staying out in the cold would’ve been too painful because sickle cell anemia compromised his circulation.

At the checkup, “Caesar looked well and said he feels pretty strong,” said NHLBI staff clinician Dr. Matthew Hsieh, who



Caesar Sant gives a thumbs-up outside the Clinical Center after his 6-month checkup.

PHOTO: LUCAS SANT

performed Caesar’s bone marrow transplant in September. “He’s not quite up to wrestling his siblings yet, but I think he’s getting there.”

It’s a story of science fusing with other healing elements—a loving family, music and a big dose of faith.

As a toddler, Caesar began playing violin. By age 4, he was playing concertos, studying multiple languages and excelling in karate. But then, over an 18-month period, Caesar had three strokes. The third stroke, in June 2014, left him in critical condition, unable to speak or walk.

When he came home from the hospital, Caesar began intensive physical therapy. Lucas, a neuroscientist and behavior educator, put his career on hold to devote himself full-time to his son’s care.

In sickle cell disease, a gene mutation causes hemoglobin—the oxygen-carrying protein in red blood cells—to clump and become crescent-shaped. The blood cells often get stuck traveling through small blood vessels, which is chronically painful. The disease deprives the body of oxygen and can

SEE SANT, PAGE 4

## ‘STAND IN YOUR SECRET POWER’ ‘Activists Without Portfolios’ Baker, Murphy Speak

BY AMBER SNYDER

Diane Baker has a checklist for herself: Do your job. Suit up. Stand in your secret power.

As the spouse of former NIH director Dr. Francis Collins, Baker has had a great deal of experience to hone her technique. A genetics counselor

by training and previous director of the Graduate Program in Genetic Counseling at the University of Michigan, Baker found herself in a



Diane Baker (c), with husband, Dr. Francis Collins, and daughter Margaret in 2019

PHOTO: LISA HELFERT

SEE ACTIVISTS, PAGE 6

## 2001 Anthrax Attacks Revealed Need to Develop Countermeasures Against Biological Threats

BY ERIC BOCK

Days after the terrorist attacks of Sept. 11, letters laced with anthrax arrived at postal facilities, news outlets and congressional office buildings, recounted Dr. Mary Wright, during a recent CC Grand Rounds lecture.

“There were a lot of questions and unknowns about anthrax in 2001,” said Wright, a medical officer in NIAID’s Division of Clinical Research. “There just wasn’t a lot of current information.”

Anthrax is a rare, but serious infectious disease caused by gram-positive, rod-shaped bacteria called *Bacillus anthracis*. Anthrax spores occur naturally in soil and can infect animals like cows, sheep and goats. People get anthrax by inhaling spores, eating



NIH firefighters use decommissioned building to train. See story, p. 12.

### ALSO THIS ISSUE

|  |    |
|--|----|
| President Biden Signs John Lewis NIMHD Revitalization Act . . . . .    | 3  |
| NIEHS Scientists Donate Lab Equipment to Visiting Researcher . . . . . | 5  |
| Olopade To Give Nirenberg Lecture . . . . .                            | 7  |
| HEAL Hosts Third Annual Gathering of Investigators . . . . .           | 9  |
| Digest . . . . .   | 10 |
| Milestones . . . . .   | 11 |
| Seen . . . . .   | 12 |

SEE ANTHRAX, PAGE 8



Dr. Rena Wing of Brown University will present the Robert S. Gordon, Jr. Lecture in Epidemiology on May 18.

### Wing Presents Gordon Lecture in Epidemiology, May 18

The Office of Disease Prevention will host the Robert S. Gordon, Jr. Lecture in Epidemiology on Wednesday, May 18 at 3 p.m. ET. Dr. Rena Wing of Brown University will present “Should Older Adults with Diabetes and Obesity Lose Weight.”

Whether older individuals with diabetes and obesity should be encouraged to lose weight remains controversial. Observational studies have suggested that weight loss in older adults may be associated with increased risk of mortality, but this conclusion may be due to unintentional weight loss.

A randomized trial in which some individuals are assigned to a weight loss program is the best way to address the question of whether intentional efforts to lose weight are appropriate for older individuals who have diabetes and obesity.

This was the rationale that led—in 1999—to NIH’s decision to launch Look AHEAD (Action for Health in Diabetes), a randomized trial comparing intensive lifestyle intervention (ILI) in adults who had type 2 diabetes and were overweight/obese.

Wing will review design of the trial and its primary outcome on cardiovascular morbidity and mortality and discuss several possible explanations for these results.

Professor of psychiatry and human behavior at the Alpert Medical School at Brown University and director of the Weight Control & Diabetes Research Center at the Miriam Hospital, Wing is well known for her research on behavioral treatment of obesity and particularly its application to type 2 diabetes. She has published more than 200 peer-reviewed articles on these topics.

Currently, she is the principal investigator on the Diabetes Prevention Program and has developed the lifestyle intervention being used in all 27 centers in that study.

Registration is not required. Watch the lecture at: [videocast.nih.gov/watch=44257](https://videocast.nih.gov/watch=44257). The presentation will be recorded and available on the ODP website <https://go.usa.gov/xu8kf> within approximately 2 weeks.

The Gordon Lecture, established in 1995 to honor the former assistant surgeon general and special assistant to former NIH director Dr.



### NIH Delegation Travels to Rx Drug Abuse Summit

NIH acting director Dr. Lawrence Tabak moderated a fireside chat with NIDA director Dr. Nora Volkow (c) and HEAL director Dr. Rebecca Baker at the 2022 Rx Drug Abuse and Heroin Summit. The conversation was part of the 11th annual summit held Apr. 18-21 at the Georgia World Congress Center in Atlanta. The chat format offered opportunity for lively discussion about the latest progress and ongoing challenges in NIH’s efforts to discover viable solutions to the nation’s opioid crisis.

PHOTO: HMP GLOBAL

James Wyngaarden, is part of the NIH Director’s Wednesday Afternoon Lecture Series. See <https://oir.nih.gov/wals> for WALS info.

### Bike to Work Day Set for May 20

The NIH Bicycle Commuter Club and the ORS Division of Amenities and Transportation Services



Then-NIH director Dr. Francis Collins pedals onto campus for a rainy Bike to Work Day 2018.

PHOTO: MARLEEN VAN DEN NESTE

invite you to celebrate Bike to Work Day on Friday, May 20.

NIH will host one of the 107 pit stops in D.C., Maryland and Virginia, supported by the Washington Area Bicyclists Association. Join us—rain or shine—in this national celebration of bicycling as an environmentally friendly, cost-effective, fun and healthy way to commute to work.

Registration is free. Visit [www.biketoworkmetrodc.org/register](http://www.biketoworkmetrodc.org/register).

Enter your employer as “MD Montgomery Co National Institutes of Health Bldg 1” and help NIH defend its proud title as the employer with the most Bike to Work Day participants. NIH is not affiliated

with, nor does it endorse any prizes associated with the event.

For NIH’ers who have never commuted by bicycle to NIH and are not sure how to begin, visit the “commuting” link on the NIH Bicycle Commuter Club website at: <http://www.nihbike.com/>.

### OPM Announces CFC Special Solicitation for Ukraine Crisis

The Office of Personnel Management has authorized a Combined Federal Campaign (CFC) special solicitation for those affected by the crisis in Ukraine.

The war in Ukraine and the resulting humanitarian and refugee crisis have strained resources throughout Europe and beyond and many of the 2021 CFC charities are working overtime and assisting refugees with food, medical attention, housing and much more.

The CFC Giving Portal has reopened for donations and will close on Thursday, June 30, 2022. For details, visit: <https://cfcgiving.opm.gov/welcome>.

## President Biden Signs NIMHD Revitalization Act

NIMHD director Dr. Eliseo Pérez-Stable, along with NIH acting director Dr. Lawrence Tabak, HHS Secretary Xavier Becerra and congressional leaders, joined President Joe Biden at the White House on Mar. 18, for the signing of the “John Lewis NIMHD Research Endowment Revitalization Act of 2021.”

The new law expands eligibility for the NIMHD Research Endowment Program (REP) to include former National Institute on Minority Health and Health Disparities and Health Resources and Services Administration Centers of Excellence. “It was an honor and privilege to



President Biden signs the “John Lewis NIMHD Research Endowment Revitalization Act of 2021.” Attending the signing in the Oval Office are (from l) Dr. Lawrence Tabak, NIH acting director; U.S. Rep. Nanette Diaz Barragán of California; HHS Secretary Xavier Becerra; U.S. Rep. Frank Pallone of New Jersey; U.S. Rep. Nikema Williams of Georgia; and Dr. Eliseo Pérez-Stable, NIMHD director.

CREDIT: THE WHITE HOUSE

participate in the signing of the bill,” said Pérez-Stable. “NIMHD is grateful for the opportunity to help more institutions build a research infrastructure that supports critical scientific research training and projects to improve minority health and promote the diversity of the scientific workforce.”



## Construction Crane Close Up

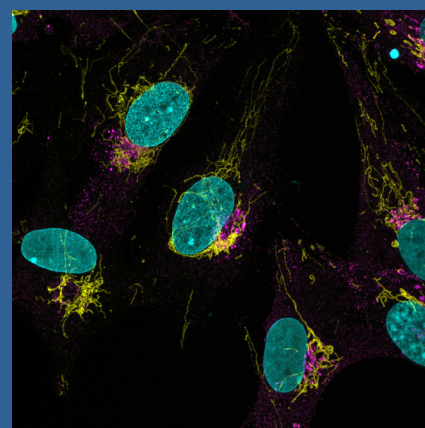
The huge crane used to build the parking garage behind Bldg. 60 (the Cloister) was dismantled on Apr. 20. Above and below, you can see two little figures high up on the large crane, unbolting the sections, and the segments being lifted down by a smaller crane.

PHOTOS: MICHELE LYONS



Authorized by the Minority Health and Health Disparities Research and Education Act of 2000 (P.L. 106-525), REP provides funding to the endowments of academic institutions.

The goals of the program are to help institutions build minority health and health disparities research capacity and infrastructure, increase the diversity and quality of the scientific workforce and enhance the recruitment and retention of individuals from populations that are underrepresented in the scientific workforce. **R**



ON THE COVER: Localization of La Crosse virus (magenta), endoplasmic reticulum (yellow), and nuclei (cyan) in virus-infected H9 human neural stem cells (hNSCs)

IMAGE: DURBADAL OJHA, JACQUELINE M. LEUNG AND KARIN E. PETERSON (ROCKY MOUNTAIN LABS, NIAID)

## The NIH Record

Since 1949, the *NIH Record* has been published biweekly by the Editorial Operations Branch, Office of Communications and Public Liaison, National Institutes of Health, Department of Health and Human Services. For editorial policies, email [nihreford@nih.gov](mailto:nihreford@nih.gov).

**Editor:**  
Carla Garnett • [Carla.Garnett@nih.gov](mailto:Carla.Garnett@nih.gov)

**Associate Editor:**  
Dana Talesnik • [Dana.Talesnik@nih.gov](mailto:Dana.Talesnik@nih.gov)

**Assistant Editor:**  
Eric Bock • [Eric.Bock@nih.gov](mailto:Eric.Bock@nih.gov)

**Editorial Intern:**  
Amber Snyder • [Amber.Snyder@nih.gov](mailto:Amber.Snyder@nih.gov)

Subscribe via email: <https://go.usa.gov/x6mgQ> Follow: [nihrecord.nih.gov/](https://nihrecord.nih.gov/)



The *NIH Record* is recyclable as mixed paper.



Family gathering. (clockwise, from l) Dr. Lucas Sant with wife Aline and their children Maria-Anita, Caesar and Helen before heading to church

bone marrow from Helen, then 6 years old.

The NIH team wound up not using Helen's stored cord blood because they could get more blood stem cells from her bone marrow. The transplant doctor described the procedure.

"Imagine the bone marrow is like a parking garage," explained Hsieh. "It's a physical structure that houses cells, or cars, that move in and out of the garage."

"Before transplant, all of Caesar's cars and the guards to the garage are all his own. For us to do the transplant, we must make some space in the garage. We take away some guards—or, lower the immune system—so we can get his sister's cells, or cars, into the garage."

transplants carry significant risk, but fortunately so far Caesar has not experienced transplant-related complications.

At his 6-month checkup at NIH, Caesar had an echocardiogram, breathing test and blood draws that were all clear, and said he's been pain-free since the transplant. Hsieh



Caesar does physical therapy twice a week to strengthen his legs.

## Sant

CONTINUED FROM PAGE 1

cause life-threatening conditions, including stroke.

The best chance of a cure is a bone marrow transplant from a healthy, fully matched relative. But Caesar's younger sister Maria-Anita, then 2, was not an exact match and carried the sickle cell gene.

At the time of Caesar's paralyzing stroke, his mother Aline was 3 months pregnant. The family wanted another child and chose to try in-vitro fertilization (IVF) to enable the potential for a life-changing treatment for Caesar. One embryo was an exact match and free of sickle cell.

When his sister Helen was born, Caesar had begun walking again and was slowly relearning to play violin. The family saved the baby's umbilical cord for a future transplant.

In early 2021, Lucas connected with NHLBI senior investigator Dr. John Tisdale and enrolled Caesar, age 13, in an NIH matched sibling sickle cell trial. In September, Caesar arrived at the Clinical Center for the transplant, where he received

*"He's not quite up to wrestling his siblings yet, but I think he's getting there."*

-DR. MATTHEW HSIEH

To do this, Caesar underwent 3 weeks of radiation and chemotherapy and received antibody medicine prior to transplant. His "parking garage" is now filled with two sets of cars and guards—a blend of his and his sister's blood cells and immune systems, what's known as mixed chimerism.

"We're hoping that further down the road, 6 to 12 months from now, he will have a stable mix of cars and guards in the garage that tolerate each other," said Hsieh.

Even well-matched bone marrow

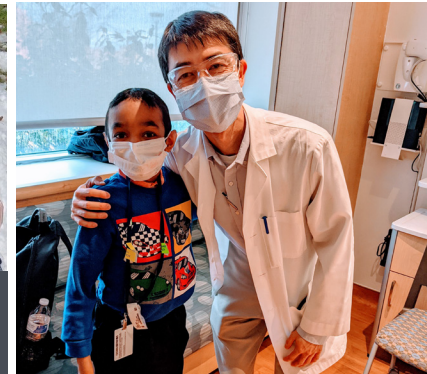
said he hopes to see Caesar's red blood cells continue to increase.

Back at the Children's Inn for one night, Caesar smiled. He was soft-spoken and walked with a limp. A week earlier, he had fallen while playing with a friend. "The legs will take time," due to effects from his previous serious stroke, said Lucas. Caesar continues working hard in physical therapy; it may take another year for his legs to gain full strength.

The other day, Caesar sat, looking deep in

thought and his dad asked what was wrong. Nothing was wrong.

"I was just thinking," said Caesar, "how I'm about to be normal like my sisters." **R**



Caesar performed at the Clinical Center in November to give thanks to his doctors. Near his home, Caesar (c) played with his sisters in the snow in March. At right, Caesar poses with his transplant doctor, NHLBI's Dr. Matthew Hsieh.

## NIEHS Scientists Help Visiting Fellow Establish Lab in Nigeria

BY ROBIN ARNETTE

When Dr. Temitope “Temi” Adedeji came to NIEHS in October 2019, he brought with him the desire to learn as much as he could so that he could transfer that knowledge to students back home in Nigeria. Five months later, the global pandemic temporarily put a halt to his plans. He has since completed his research and received a NIH grant. He will travel back to Nigeria with his own scientific equipment.

“It is wonderful that NIEHS intramural scientists have come together to donate critical scientific equipment to Dr. Adedeji,” said NIEHS scientific director Dr. Darryl Zeldin. “It will certainly help him start an independent laboratory in Nigeria and ensure his continued productivity.”

### When a Plan Comes Together

Before Adedeji came to the U.S., he was a senior lecturer at the Federal University of Technology Akure in Nigeria. Since Nigeria doesn’t have many career opportunities for researchers, many young men and women interested in science must change fields or take whatever jobs they can find to make a living. Adedeji knew he could help change the situation.

“I wanted to make a difference by giving students and trainees the opportunity to have a better training experience,” said Adedeji. “If I could help two kids in the beginning, over time it could become the critical mass that snowballs into something special.”



Because of the generosity of NIEHS scientists, this equipment—incubators and freezers—and more will make the journey to Adedeji’s new research lab in Nigeria.



Dr. Temitope “Temi” Adedeji (l) stands in front of some of the equipment he will use to train the next generation of researchers at Federal University of Technology Akure in Nigeria. At right, Dr. Paul Wade helped facilitate donations of the equipment.

PHOTOS: STEVE MCCA/W/NIEHS



It will identify the type of histone modification in every point in the genome as a function of diet.

“Adedeji is using techniques that we have implemented in our lab in the last year and testing a hypothesis that is central to our research,” Wade said.

### Equipment Donations

Wade said that he knew it would be challenging for Adedeji to get

He wanted up-to-date training in epigenetics, so he contacted Dr. Paul Wade, acting chief of the NIEHS Epigenetics and Stem Cell Biology Laboratory and head of the eukaryotic transcriptional regulation group. When Wade invited him to NIEHS as a visiting fellow, the first part of Adedeji’s plan was coming together.

### Training in Epigenetics

A major interest of Wade’s group is how the Western diet, which is high in fat, influences colon cancer risk. Wade’s hypothesis is the carbon content of high-fat diets is an influencer of the epigenome. One of the ways to test this hypothesis is to use a high-fat diet that does not induce obesity, such as the ketogenic diet, which is high in fat but low in sugar.

Adedeji gladly took on the project and fed four groups of mice a specific dietary

program: high-fat diet, ketogenic diet, control chow diet and a low-fat diet. He examined organ damage and took physiologic measurements such as weight and serum hormone levels of insulin. He also used Western blots to determine how histone modifications, particularly acylation, change as a function of diet throughout the genome.

Wade said before Adedeji leaves the lab, he’ll connect all the changes in the epigenome to the gene-specific level by doing an assay called “cut and tag.”

scientific equipment in Nigeria, so he encouraged him to take smaller equipment from his lab that wasn’t being used. Wade then emailed all NIEHS



Centrifuge, tagged for transport

research group leaders to ask whether they had older equipment headed for surplus, and several responded.

NIEHS Immunity, Inflammation and Disease Laboratory chief Dr. Michael Fessler was especially helpful since he had equipment designated for the institute’s warehouse that was no longer being used.

NIEHS inventory management officer Kim Jones gave Adedeji access to the surplus equipment and handled the paperwork to make sure the institute operated within NIH foreign donation guidelines.

“We are delighted to have played our small part in helping Temi plant these exciting scientific seeds in Nigeria,” said Fessler.

### Collaboration to Continue

Adedeji is working on a research paper about his work and hopes he and NIEHS will work together in the future to improve the pipeline of Nigerian scientists. His long-term goal is to have Nigerian students come to NIEHS to take advantage of state-of-the-art training. **R**

## Activists

CONTINUED FROM PAGE 1

new role when Collins took the position of NIH director.

What does a spouse or partner do to support the NIH mission? Baker had to define that role for herself, and she shared her experience in the recent lecture “Activist Without Portfolio,” in the Empowerment of Under-Represented Researchers series hosted by the NIH Oxford-Cambridge Program (OxCam).

“I [didn’t] have credentials or accountability [for the job], but what I do bring to my role is simply who I am,” Baker said. Her background as a genetics counselor (and, before that, a person who had grown up in a very small Midwestern town) did not lend itself in any obvious way to a role as an NIH



At left, Baker and Collins volunteer to cook and serve dinner at the Children’s Inn in 2015; at right, first lady of New Jersey Tammy Snyder Murphy

functions. She was Collins’s plus-one for many events, and quickly had to learn to navigate these occasions on her own because her husband was often a speaker.

“My goal [was] to make this time matter,” she explained. “The reason you get invited

Day and hosting prospective institute/center directors at her home with Collins. She found a niche at the Children’s Inn, serving on its board of directors but also taking on a more hands-on role with the patients and their families. She cooked dinners for them and took them on tours of D.C. She also served as a board member for the Friends of Patients at NIH, and volunteered with Camp Fantastic, a summer camp for NIH’s pediatric cancer patients.

Her endeavors both within and outside of NIH were driven by her own secret powers: her “intense curiosity about others” and her “desire for them to do the right thing,” she revealed. Baker firmly believes that everyone can find a secret power within themselves and use it to guide themselves to success.

“You have to really feel it in yourself,” she said, and that will let you know that you’re on the right track.

★★★  
*“Draw upon the relationships you have built, as [they are] one of the most important resources anyone can access. Working together, we truly can do anything.”*

-TAMMY SNYDER MURPHY

representative. It was “totally new terrain,” she recalled. However, she soon came up with a checklist that would help her succeed no matter the situation.

Her “do your job” tenet means just that. By considering her attendance at events as a job, she could be her best professional self. “Suiting up” doesn’t just mean an outfit (although comfortable shoes are a must for Baker); to her, it means bringing “flexibility, humor, empathy and curiosity” to every situation.

Baker’s next bullet point is “stand in your secret power.” She asked viewers to think about their accomplishments or things they most want people to know and to consider “what’s behind it?” Qualities such as hard work, perseverance, integrity and discipline are, she said, “[a] set of secret powers that you’re going to stand in.” One can use those unique skills and attributes to find common ground with others and start meaningful conversations.

Baker found that “curiosity was often [her] biggest asset,” and used that natural inquisitiveness to network at social

back to things is not because you’re an expert, but because you’re more than an expert. You’re a person who contributes, who makes the environment rich, who engages others...you’re doing your work.”

She viewed her role as that of an



Dr. Brad Wood (top l) and Jocelyne Rivera, bottom, listen as Baker talks about carving out her unique role as NIH ambassador while her husband served as NIH director.



Baker and Collins perform a musical skit at the Camp Fantastic annual talent show in 2019.

PHOTO: MARLEEN VAN DEN NESTE

The lecture also featured Tammy Snyder Murphy, first lady of New Jersey. Described by others as “a force to be reckoned with,” she is another woman who uses her unique platform for good.

Murphy stepped into her role in 2018 when her husband, Phil Murphy, became governor of N.J. She had previously served in a variety of positions, from finance to nonprofits to representing the U.S. jointly with her husband in the Federal Republic of Germany.

As first lady, Murphy has “made the most of [her] ability to convene people across the state for the betterment of [N.J.]” She has championed many initiatives, such as tackling New Jersey’s infant and maternal health care crisis, incorporating climate change education into K-12 classrooms and jump-starting women-owned businesses.

Under Murphy’s leadership, her state opened a chapter of Golden Seeds, which is an angel investor network that supports female entrepreneurs. Despite the N.J.

chapter’s inauspicious timing (it opened in February 2020), it was still the most successful chapter in the U.S. in 2020.

Murphy also has a track record for climate change advocacy, and, thanks to her efforts, her state is now the first in the nation to incorporate climate change education across all K-12 learning standards.


Her third core initiative, Nurture NJ, took on her state’s infant and maternal health crisis. New Jersey

ranks 47<sup>th</sup> out of 50 for states with the highest maternal mortality rate, and Black women and their babies are 7 and 3 times more likely to die than their White counterparts.

“There is a fundamental breakdown across sectors, and...all social determinants of health really impact outcomes,” Murphy explained, adding that institutionalized racism lies at its core. Her strategic plan aims to reduce the state’s maternal mortality rate by 50 percent over 5 years and tackle the health inequities that contribute to this disparity.

Like Baker, Murphy emphasized the importance of building connections with others. “Draw upon the relationships you have built, as [they are] one of the most important resources anyone can access,” she advised. “Working together, we truly can do anything.”

The archived lecture can be viewed at: <https://videocast.nih.gov/watch=44998>.

For more information on OxCam, visit: <https://oxcam.gpp.nih.gov/>. 

## Olopade To Deliver Nirenberg Lecture, May 25

Dr. Olufunmilayo Olopade of the University of Chicago will deliver the Marshall W. Nirenberg Lecture, part of the Wednesday Afternoon Lecture Series, on May 25 from 3 to 4 p.m. The title of her lecture is “Genomic Basis of Breast Cancer Progression in Blacks.”

The presentation will be held in Lipsett Amphitheater, Bldg. 10 and also videocast at <https://videocast.nih.gov/watch=44259>. (Those wishing to attend in person must register; contact [WALSoffice@od.nih.gov](mailto:WALSoffice@od.nih.gov).)



Dr. Olufunmilayo Olopade of the University of Chicago

Olopade directs the University of Chicago Hospital’s Cancer Risk Clinic and is the Walter L. Palmer distinguished service professor in medicine and human genetics there. A leader in cancer genetics, Olopade studies familial

forms of cancers, molecular mechanisms of tumor progression in high-risk individuals, and genetic and non-genetic factors contributing to tumor progression in diverse populations.

Olopade’s laboratory research is focused on using whole-genome technologies and bioinformatics to develop innovative approaches to democratize precision health care for all and thereby reduce global health disparities. She stresses comprehensive risk-reducing strategies and prevention in high-risk populations, as well as earlier detection through advanced imaging technologies.

The annual Nirenberg Lecture, established in 2011, recognizes Marshall Nirenberg for his work to decipher the genetic code, which resulted in his receiving the 1968 Nobel Prize in Physiology or Medicine. The lectureship recognizes outstanding contributions to genetics and molecular biology.

More information about the lecture series is posted at <https://oir.nih.gov/wals>.

## Jeang Memorial Lecture Features NEI’s Chiang

Dr. Michael F. Chiang, director of the National Eye Institute, will present “Artificial Intelligence, Ophthalmology...and Being an Asian-American Clinician-Scientist,” the 2022 Kuan-Teh Jeang Memorial Lecture on Thursday, May 26 from 1 to 2:30 p.m. ET. Tune into the virtual event at <https://videocast.nih.gov>.

Dr. K.T. Jeang, virologist and chief of the molecular virology section of NIAID’s Laboratory of Molecular Microbiology, advocated for the advancement of Asian-American scientists. He died in 2013. The annual lecture, which celebrates his legacy, is cosponsored by the Office of Intramural Research and the Office of Equity, Diversity and Inclusion.



NEI director Dr. Michael Chiang

## Anthrax

CONTINUED FROM PAGE 1

animals that were infected with anthrax or getting spores in a cut or scrape. Inhalational anthrax is the deadliest form and without aggressive treatment, it's almost always fatal.

"The first letters were mailed on Sept. 18, just a week after 9/11, when the nation was still in shock," Wright said. "Senate and House offices had to close down because they received anthrax letters. There was a big outcry about the need to get diagnostic testing and figure out how to face this uncertainty."

The attacks lasted a few months. In total, 22 people got anthrax and 5 of them died. It cost more than a billion dollars to decontaminate post offices and other government buildings. Few doctors had experience treating anthrax. Before 2001, the last case of inhalational anthrax reported in the U.S. was in 1976.

The use of mail to spread powdered anthrax spores spurred the biomedical and public health communities to develop countermeasures against anthrax and other biological threats, such as Ebola and smallpox, said Dr. Arthur Friedlander, senior scientist at the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID).

"The horrendous possibility of using microbes to intentionally cause disease was realized," said Friedlander. "We were now focused on providing medical countermeasures."

Because inhalational anthrax infections

are almost always lethal and occur infrequently, human challenge studies are not ethical or feasible, he said. In response to the attacks, FDA issued the Animal Rule in 2002. It allows "for the approval of drugs and licensure of biological products when human efficacy studies are not ethical and field trials



Anthrax spores

PHOTO: JANICE HANEY CARR

to study the effectiveness of drugs or biological products are not feasible."

Anthrax spores do not

germinate all at once, Friedlander said. They can remain dormant for a long time inside a host. Because antibiotics destroy only germinated spores and bacteria, discontinuing post-exposure treatment before every spore germinates can have deadly consequences.

In a 1993 non-human primate study, Friedlander and his colleagues found prolonged antibiotics alone could result in significant long-term protection.

"These results suggested that therapy for an unimmunized person exposed to an aerosol of anthrax spores should consist of long-term suppressive antibiotics," he said.

The study became the basis for CDC's recommendation that people who have been exposed to anthrax take antibiotics for at least 60 days. After the attacks, about 10,000 people potentially exposed to anthrax were put on antibiotics for 60

to perform a series of studies. First, they sought to determine if receiving an anthrax vaccine after exposure could reduce the time non-human primates were required to be on antibiotics. The results suggested that, when combined with post-exposure vaccination, antibiotics can be given for as few as 14 days in this model. Once again, CDC updated its treatment guidelines based on Friedlander's research to include vaccination after anthrax exposure; current guidelines advise that antibiotics be continued for 2 weeks after the last dose of the vaccine series.


"Shortening the duration of antibiotic post-exposure prophylaxis in a bioterrorism event involving *B. anthracis* by adding post-exposure vaccination would be of great benefit because of non-compliance and side effects associated with prolonged therapy," Friedlander noted.

For treatment of active infection, antibiotics may be given for as little as 10 days in non-human primates, Vietri explained.

In this study, monkeys were exposed to a high dose of anthrax and given antibiotics for 10 days beginning after anthrax bacteria were found in the bloodstream. The animals that survived once the antibiotics ended were immune to reinfection, which correlated with the development of antibodies to the protective antigen (PA) of anthrax.

The group concluded that, "Patients who are treated for symptomatic anthrax and recover should be tested for the development of an immune response to *B. anthracis*," he said. "The presence of anti-PA antibodies may be useful in determining when antibiotics may be discontinued."

Researchers have made progress against anthrax, Wright said. Still, clinical questions remain. For example, can non-invasive imaging findings characterize the stages of infection? How many antibiotics are needed to treat an infection? When is the best time to administer anti-toxin treatment and what are the long-term effects in survivors of anthrax?

"The anthrax letter attacks of 2001 revealed the urgent need to be able to understand old pathogens using current and modern medical tools," concluded Wright. "The investment in biodefense and emerging infections research infrastructure—and in mechanisms such as the Animal Rule—have made rapid discovery possible years later." 



After the presentation, speakers participate in a Q&A session with Dr. Thomas Burklow (bottom, r), acting director, Office of Clinical Research Training and Medical Education.

days. However, only 44 percent adhered to the treatment regimen.

Friedlander; Dr. Nicholas Vietri, an infectious disease physician formerly with USAMRIID and now at VA Boise Healthcare System; and Wright entered an interagency collaboration



## MEETING THE MOMENT

## HEAL Hosts Third Annual Investigators Gathering

BY PARISA PARSAFAR

*“All Americans deserve access to timely and effective treatments and services.”*

DHHS assistant secretary for health Dr. Rachel L. Levine recently opened the third annual meeting of NIH’s Helping to End Addiction Long-term initiative (HEAL) with those words about the millions of Americans who deal with pain and addiction.

HEAL director Dr. Rebecca Baker welcomed more than 400 members of the initiative’s research community to the meeting who came together virtually to share the latest advances toward ending addiction long-term—HEAL’s vision.

Against the backdrop of record-breaking numbers of overdose deaths nationwide, HEAL investigators discussed person-centered strategies, community-based approaches and the ingenuity of the scientific community responding to the rapidly evolving crisis made worse by Covid-19 and shifting patterns in drug use.

The landscape has changed dramatically from a crisis driven by prescription opioid

◆ ◆ ◆

***“Interdisciplinary research like HEAL is how things get done in the 21st century.”***

-DR. RAHUL GUPTA

◆ ◆ ◆

misuse to one now flooded with potent synthetic drugs like fentanyl, recounted NIDA director Dr. Nora Volkow. She presented disturbing trends of polysubstance use and rising overdose rates among teens, young adults and underserved populations.

A highlight of the meeting was a conversation with the HEAL community partner committee, people with lived experience who advise HEAL. The importance of peer recovery support and trust was underlined by committee member Kevin Charles, certified peer specialist and recovery coach with Family and Medical Counseling, Inc., in Washington, D.C. “People don’t care how much you know until they know how much you care,” he said.



The HEAL community partner committee joined NIH leadership in conversation at the third annual NIH HEAL initiative investigators meeting.

Plenary sessions and scientific symposia showcased the broad scope of HEAL research. Scientists highlighted current efforts to integrate treatments for opioid use disorder, diverse types of pain and psychological distress into existing health care systems.

is how things get done in the 21st century,” noted Dr. Rahul Gupta, director of the White House Office of National Drug Control Policy, during a virtual fireside chat with NIH acting director Dr. Lawrence Tabak. The two discussed placing people at the center of the government’s work, and the need for leveraging real-time “big data” to document and track non-fatal overdoses and illicit substance use within and across communities.

A roundtable discussion with leaders of federal agencies—Dr. Robert Califf of the Food and Drug Administration, Dr. Debra Houry of the Centers for Disease Control and Prevention and Dr. Miriam Delphin-Rittmon of the Substance Abuse and Mental Health Services Administration—focused on how NIH research can provide scientific evidence to drive policy and inform government efforts to better save lives.

Together, the robust body of research presented at this year’s meeting matched the magnitude of the crisis of opioid misuse, overdose and poorly treated pain. The all-hands-on-deck effort underway through the NIH HEAL initiative is making progress joining the power of research and the strength of communities.

View the meeting agenda and archived recording at <https://heal.nih.gov/news/events>. For more information about HEAL, visit <https://heal.nih.gov/>. **R**

## Tobacco Rates are Decreasing Among Adults with Depression, Substance Use Disorder

A new analysis of national survey data reveals significant reductions in cigarette use among U.S. adults with major depression, substance use disorder or both from 2006 to 2019. These findings suggest that groups at higher risk of cigarette smoking can be reached by, and may have benefited from, tobacco use prevention and cessation efforts that have led to significant tobacco use declines in the general population.



Analysis shows declines in smoking among adults across age, sex and most racial and ethnic subgroups.

PHOTO: SAMUEL PERALES/SHUTTERSTOCK

The study, conducted by NIDA and the Substance Abuse and Mental Health Services Administration, was published in *JAMA*.

Cigarette smoking, the leading preventable cause of disease, disability and death in the U.S., has been declining overall. Experts attribute this in part to increases in available treatments, insurance coverage of these treatments, cigarette prices, smoke-free policies and media and educational campaigns in recent decades. But,

until now, smoking rates remained unchanged in people with substance use disorders, major depression or other psychiatric disorders.

Analyzing data from more than 558,000 adults who participated in the National Survey on Drug Use and Health between 2006 and 2019, researchers found that while people with major depression, substance use disorder or both were more likely to smoke cigarettes, improvements in smoking cessation were seen during this timeframe.

After controlling for factors such as age, sex, race/ethnicity, education and family income, researchers found that past-month smoking rates declined by 13.1 percent among adults with a past-year major depressive episode and by 10.9 percent among adults with past-year substance use disorder from 2006 to 2019. Similar smoking rate declines were seen in people with co-occurring substance use disorder and major depression.

“These declines tell a public health success story,” said NIDA deputy director Dr. Wilson Compton, senior study author. “However, there’s still a lot of work to be done to ensure [these numbers] continue to decrease.” To that end, Compton recommended that health care providers integrate smoking cessation therapies into existing behavioral health treatments.

Only one racial and ethnic subgroup did not experience a past-month smoking decline: non-Hispanic American Indian or Alaska Native adults. They face the highest smoking and lowest quitting rates in the U.S., highlighting the need to channel additional prevention and treatment efforts into these communities.

## Researchers Create 3-D Model for Rare Neuromuscular Disorders

A scientific team supported by NIH has created a tiny, bioengineered 3-D model that mimics the biology of chronic inflammatory demyelinating polyneuropathy and multifocal motor neuropathy, a pair of rare, devastating neuromuscular diseases. The researchers used the organ-on-a-chip, or “tissue chip,” model to show how a drug could potentially treat the diseases. They provided key preclinical data for a drug company to submit to the Food and Drug Administration to get authorization for testing in a clinical trial.

Investigators are exploring the use of tissue chips for testing candidate drugs and modeling diseases. Designed to support living human tissues and cells, tissue chips mimic the structure and function of human organs and systems, such as the lungs, heart and liver.

This work provides one of the first examples of scientists using primarily tissue chip data for an FDA investigational new drug application to test the efficacy of a candidate drug in people with rare diseases. The drug company Sanofi started recruiting participants into a phase 2 clinical trial in April 2021. The drug was tested for safety previously and approved by the FDA for a different indication.

The tissue chip research was led by Hesperos, Inc., a company partially funded by a small business innovation research grant from NCATS.

In these neuromuscular diseases, the immune system makes proteins called antibodies that damage nerve cells and slow down messages moving from the brain to the muscles, making it hard for people to move their limbs.

Dr. James Hickman, chief scientist at Hesperos, and his colleagues described their model in *Advanced Therapeutics*. Their tissue chip consisted of two cell types: motoneurons (which transmit messages from the brain to muscles) and Schwann cells, which help the signals move more quickly.

The researchers showed that exposing the cells to blood serum from people with these rare diseases caused a shower of immune system antibodies against the cells. This made the motoneuron signals move more slowly. After treatment with TNT005, a drug that blocks the immune system reaction, the cells and the message speed returned to normal.

This study could open the door to developing new therapies for other rare diseases by establishing a new avenue for repurposing existing drugs.

## Vision Improves with Treatment for Blinding Blood Vessel Condition

New research shows that a treatment for retinal vein occlusion (RVO) yields long-lasting vision gains, with visual acuity remaining significantly above baseline at 5 years. However, many patients require ongoing treatment.

RVO is one of the most common blinding conditions in the U.S. Without treatment, central retinal vein occlusion (CRVO), the most severe type, often leads to significant and permanent vision loss.

A report on 5-year outcomes of the Study of Comparative Treatments for Retinal Vein Occlusion 2 (SCORE2), was published in the *American Journal of Ophthalmology*. SCORE2 was funded in part by NEI.

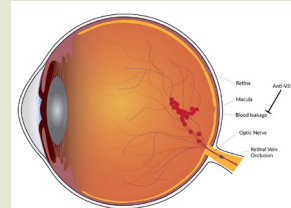
RVO is caused by a blockage of the veins carrying blood away from the retina, which can lead to rapid and severe loss of visual acuity. The most effective treatment, injections of anti-vascular endothelial growth factor (VEGF) drugs, helps control blood vessel leakage and swelling in the retina.

In 2017, SCORE2 clinical trial investigators reported that two types of anti-VEGF treatment were equally effective at improving visual acuity in people with macular edema due to RVO.

Half of the study participants received Avastin (bevacizumab) while the other half received Eylea (aflibercept). Both drugs were injected monthly. At the 6-month mark, the vision of participants in both groups had, on average, improved over 3 lines on an eye chart.

After the initial 12-month study period, most physicians reduced the frequency of anti-VEGF injections and some switched their patients to the other anti-VEGF drug. At 5 years, many participants had lost some visual acuity compared to their 12-month checkup; however, they retained on average 3 lines of improvement.

Study chair Dr. Ingrid Scott of Penn State College of Medicine said the study “underscores the importance of disease monitoring and individualized treatment to achieve the best possible vision.”



Occlusion of retinal veins can lead to blood vessel leakage in the retina.

IMAGE: NEI

## Sharpless Steps Down as NCI Director

Dr. Norman “Ned” Sharpless stepped down as NCI director, effective Apr. 30.

“Working at the National Cancer Institute has been the highlight of my career, and I am honored to have had the chance to serve my country in this role, alongside so many talented scientists and administrators,” Sharpless said. “I leave this job knowing that the talent and passion present at NCI, across the Biden-Harris Administration and throughout the cancer research community will continue to fuel tremendous progress for people with cancer in the years ahead.”



Dr. Ned Sharpless

Sharpless was sworn in as the 15th director of NCI on Oct. 17, 2017. He also served as acting commissioner for food and drugs at the Food and Drug Administration for 7 months in 2019, before returning to the NCI directorship.

“During my time in the federal government, I have been inspired by the ways that researchers, caregivers, advocates and survivors have broken down silos to collaborate and embrace new ways of working together to solve some of the toughest problems in cancer,” Sharpless said. “President Biden’s continued commitment to the Cancer Moonshot will foster even greater progress. The community stands ready to meet the President’s call to end cancer as we know it.”

“The President’s goal of ending cancer as we know it today is grounded, in part, in the work of scientific discovery that Ned Sharpless has led at NCI,” said White House Cancer Moonshot coordinator Dr. Danielle Carnival. “We have an audacious but achievable goal to reduce the cancer death rate by at least half in 25 years and to improve the experience of all whose lives are impacted by cancer—working across government to develop and deploy additional ways to prevent, detect and treat cancer—and Dr. Sharpless contributed greatly to that vision.”

At NIH, Sharpless championed health equity; developed important programs in data science, including the Childhood Cancer Data Initiative; and advocated forcefully for policies to ensure continued support for investigator-initiated research in cancer and diversity in the cancer research workforce.

“Dr. Sharpless’s ability to manage complex problems has been invaluable to several NIH initiatives, including the agency’s response to the



Dr. Douglas Lowy

Covid-19 pandemic and improving equity and inclusion and in his role as chair of the NIH Clinical Center Governing Board,” said NIH acting director Dr. Lawrence Tabak. “Dr. Sharpless’s absence will surely be felt by his colleagues at NCI and beyond.”

NCI principal deputy director Dr. Douglas Lowy will serve as NCI’s acting director until a permanent director is appointed by the President. He served

as NCI’s acting director from April 2015 to October 2017, following the resignation of Dr. Harold Varmus, and again in 2019 while Sharpless served as acting FDA commissioner.

Lowy also is chief of the Laboratory of Cellular Oncology in NCI’s Center for Cancer Research. His research interests include the biology of papillomaviruses and the regulation of normal and neoplastic cell growth.

In the 1980s, Lowy and Dr. John Schiller studied the genetic organization of papillomaviruses and identified the oncogenes encoded by the virus. More recently, they have worked on papillomavirus vaccines and the papillomavirus life cycle. Their laboratory was involved in the initial development, characterization and clinical testing of the preventive virus-like particle-based HPV vaccines that are now used in three FDA-approved HPV vaccines.

Lowy is a member of the National Academy of Sciences (NAS) and a member of the Institute of Medicine of the NAS.

## NIBIB Alumni Selected for NSF Research Fellowships

Two NIBIB intramural trainees are recipients of 2022 National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) awards. Maria Karkanitsa and Tran Ngo, intramural trainees from NIBIB’s section on immunoengineering, are among nearly 2,200 awardees nationally.

Karkanitsa has entered a Ph.D. program in bioengineering at the University of California, San Diego. Ngo is a current postbaccalaureate intramural research training fellow, who is in the process of matching with a graduate program in biomedical engineering.

NIBIB investigator and section chief Dr. Kaitlyn Sadtler mentored each of the awardees from her lab. “These fellows have been really fantastic and wonderful to work with in the lab,” she said. “I have no doubt they will be—and are already—just brilliant scientists. We are very proud and excited for them.”

Kenneth Adusei, an alumnus of the lab, was

selected for the NSF Graduate Research Fellowship in 2021 and is currently a Ph.D. student in biomedical engineering at Johns Hopkins University.

The fellowships recognize and support outstanding graduate students in NSF-supported STEM disciplines who are pursuing



NSF GRFP awardees (from l) Kenneth Adusei, Maria Karkanitsa and Tran Ngo, at the bench in NIBIB’s section on immunoengineering

PHOTO: NIBIB

research-based master’s and doctoral degrees at accredited U.S. institutions.

The 5-year fellowship includes 3 years of financial support including an annual stipend of \$34,000 and a cost-of-education allowance of \$12,000 to the institution.

## NIHFD TRAINS

**'Our Bar Is Higher,' Says Fire Department Captain**

BY AMBER SNYDER

All of that construction on campus has a silver lining: the NIH Fire Department (NIHFD) can practice their firefighting skills on decommissioned buildings that are scheduled to

be demolished. Such is the case with several of the recently demolished buildings on the south end of the Bethesda campus.

"Because the NIHFD doesn't have their own training center, we rely on opportunities such as building demolitions [to use as temporary training sites]," NIHFD Capt. John Daffron explained. Bldgs. T39 (the former fitness center) and old labs 18 and 32 all filled a crucial need for the NIHFD in the structures' final days.

NIH hires only experienced firefighters, but they continue to participate in various training exercises (at NIH and other fire departments throughout Maryland) to keep them primed for any situation.

NIH is also a unique place to be a firefighter, Daffron added, because of the nature of the facility. Firefighters must be able to tackle environments as diverse as a research hospital, biosafety level 3 laboratories, an underground Metro station, childcare facilities, residential housing and more, all with as many as 21,000 employees working on site in various occupations. The NIHFD also has mutual aid agreements with its neighbor, Walter Reed National Military Medical Center, and the fire departments for Montgomery County.

"Our bar [for training] is higher because it has to be," Daffron said.

NIH currently employs 30 firefighters. They work a unique schedule: 48-hour shifts with 72 hours off, for a total of 144 hours per pay period. There are a minimum of 10 firefighters working each shift, which is enough to operate the company's fire engine, ladder truck, hazmat truck and ambulance at each call.

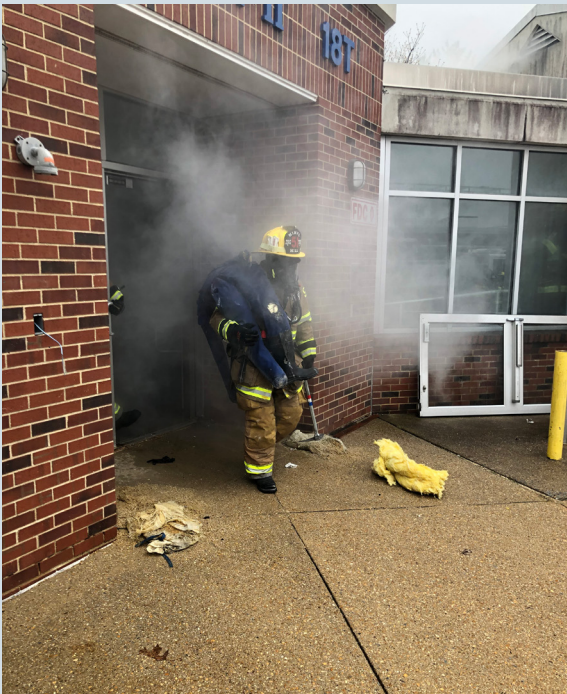
There are countless scenarios that can require any combination of this equipment. In a recent training session, firefighters went through drills on forced entry, smoke ventilation, breaching walls and running hose lines.

One deceptively simple exercise involves breaking into locked rooms.

"People's creativity for locking and securing doors is infinite," Daffron said, and firefighters need to figure out how to gain entry. Members practiced breaking padlocks with axes and Halligan bars—multipurpose forcible entry tools used for prying, twisting, punching or striking.

In another exercise, firefighters used a non-toxic smoke machine to simulate a fire inside one of the wings of Bldg. 18. Live fire trainings typically do not happen on campus due to environmental concerns, but the smoke machine did an admirable job of filling the hallway and rooms with thick smoke. Firefighters entered the building, broke a window to ventilate and cut through the smoke with water. They also rescued a dummy that had been placed inside.

Moral of the story? Waste not, want not. Even decommissioned buildings have a purpose.



Above, safe! Technician Danny Hill removes a "victim" after performing a coordinated search with zero visibility during a simulated fire. Below left, Master firefighter and crew leader Patrick Woodburn (l) directs technicians Malcolm Goudey (c) and Danny Nguyen (r) to advance a hose into Bldg. 18. At right, Master firefighter Patrick Woodburn forcibly opens a locked door to perform search and rescue for a trapped victim.

PHOTOS: MAT CHIBBARO

