

## THE BIG READ

### Mukherjee Provides Intimate Look at the Gene

BY DANA TALESNIK

The best book discussions raise thought-provoking questions, spark lively debate and leave us grappling with profound subjects. So it was most fitting that the inaugural NIH Big Read featured Pulitzer Prize-winning author Dr. Siddhartha Mukherjee talking about his latest book *The Gene: An Intimate History*.

Mukherjee, a cancer physician at Columbia University Medical Center and assistant professor of medicine at Columbia, described the prospects of gene editing, which are both exciting and ominous, and leave many unanswered questions. Speaking



Author Dr. Siddhartha Mukherjee (l) with Dr. Michael Gottesman (c) and Dr. Doug Lowy

recently to a packed Masur Auditorium, including many NIH'ers who attended the four book discussions at the NIH Library leading up to the Big Read, he followed up his presentation by joining an informal conversation with NIH director Dr. Francis Collins.

As a cancer geneticist, Mukherjee said he wrote *The Gene* as a prequel to his

award-winning *The Emperor of All Maladies*. Understanding cancer, he said, requires understanding how cells behave and mutate. Writing the book also was a personal journey, given his family's history of mental illness. Its first pages discuss his visit to a mental hospital in India to see his first cousin, confined for severe schizophrenia.

But it was Mukherjee's fascination with emerging technologies that compelled him to write *The Gene*.

"I began to really think that the extent of these technologies to transform human beings and human culture vastly outweighed the kind of things we discuss in technology today," he said. And it begs a critical question: "What do we do," he asked, "when we can decipher and potentially change our own codes of instruction?"

To frame the debate, Mukherjee put the sheer size of the genome in context.

SEE MUKHERJEE, PAGE 6



Horses meet kids at 23rd Police Day. See p. 12.

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### Schiffman Inspires, Educates On Cervical Cancer

BY RICH MCMANUS

Listen up, those of you who have been around NIH for only a cup of coffee: Dr. Mark Schiffman's Robert S. Gordon Jr. Lecture on May 3 might well have served as a primer on the meaning of an NIH career. It was heartfelt, impassioned, honest, funny, encouraging and offered good news about preventing cervical cancer via vaccination.

And it only cost NIH about \$30,000 in lost productivity among those who attended, according to epidemiologist Schiffman's calculations.

A senior investigator in the Clinical Genetics Branch of NCI's Division of Cancer Epidemiology and Genetics, Schiffman, who calls himself "a preventive medicine doc," has spent his entire 35-year career at NIH.

"I'm like a microscope—I keep focusing down, clicking further and further down

SEE SCHIFFMAN, PAGE 4



A bicyclist exits the Bldg. 1 pit stop with a child not far behind.

### Warmth No Deterrent to Bike To Work Day

BY ERIC BOCK

This year's Bike to Work Day was "one of the warmest, but certainly not the rainiest," said NIGMS's Dr. Vernon Anderson, president of the NIH Bicycle Commuter Club (NIHBCC). But the heat didn't deter NIH's bicycle

SEE BIKE TO WORK, PAGE 8



Illustration of an alchemy workshop in Johann Mylius's *Opus Medico-Chymicum*, 1618

IMAGE: NATIONAL LIBRARY OF MEDICINE

## NLM Celebrates 20th Anniversary of Harry Potter Series

On June 26, 1997, British author J.K. Rowling published *Harry Potter and the Philosopher's Stone*, the first book in the Harry Potter series and the beginning of a global, pop cultural phenomenon.

To celebrate Harry Potter's 20th anniversary and the world-renowned historical collections of the National Library of Medicine, the library will offer a series of special events, including a week-long display featuring rare books and incunables (books printed before 1501) that influenced the Harry Potter series, and the popular NLM traveling exhibition "Harry Potter's World: Renaissance Science, Magic, and Medicine," lectures and more. Events will be held June 26-30 at NLM.

The library will display 15th, 16th and 17th-century collection items, which represent the history that informed some of the characters and settings of the Harry Potter series and formed the foundation of the traveling exhibition.

The special display and traveling exhibition explore the magic of Harry Potter and its roots in Renaissance traditions that played an important role in the development of Western science.

The display and exhibition highlight the important ethical topics Rowling's stories examine. Visitors can navigate the display using a "Marauder's Map" and take home coloring pages fashioned from the books and incunables on display.

Harry Potter's World and the Renaissance books and incunables will appear in the History of Medicine Division reading room at NLM's Bldg. 38A during the week of June 26. The event is open to the public, 10 a.m.-4 p.m. each day. Reservations are encouraged as only a limited number of people can be accommodated in the reading room. Guided tours are available on request by email at [NLME Exhibitions@mail.nih.gov](mailto:NLME Exhibitions@mail.nih.gov) or by phone at (301) 594-1947.

NLM will also offer two special lectures as part of the week-long appreciation. On Tuesday, June 27 at 2 p.m., exhibit curator Elizabeth Bland presents "A Look into the Pensieve: Reflections on Harry Potter at Twenty Years."

Then, on Thursday, June 29 at 2 p.m., Dr. Stephen

Greenberg, head of rare books & early manuscripts at NLM, gives a talk titled "Monsters in the Stacks: How Harry Potter Came to NLM." Both talks take place in Lister Hill Auditorium, Bldg. 38A.

To benefit audiences around the world, and especially those who are joining in the celebration of the Harry Potter 20th anniversary, NLM will launch an online curated collection of the 15th, 16th and 17th-century books that will appear in the week-long display, as well as related works.



The scene at a recent SCAC meeting

## NIH Supply Center Holds Advisory Council Meeting, June 27

The NIH Supply Center (SC) supports NIH by providing lab, medical and office supplies in a cost-effective and convenient manner. The SC listens to the NIH community and looks for ways to improve products and services.

The SC hosts a Supply Chain Advisory Council (SCAC) every quarter; the meetings are open to all NIH personnel. The next SCAC will be held Tuesday, June 27 at 10 a.m. in Bldg. 31, Conf. Rm. 6C7.

This is a chance to discuss specific requirements that your institute needs in order to guide future procurements. The SC appreciates all feedback; the information helps grow its product portfolio. Over the past year, the SC has added more than 150 new items based on advice from SCAC meetings.

To register for the upcoming SCAC, visit <https://www.eventbrite.com/e/ni-supply-center-supply-chain-advisory-council-june-27-2017-tickets-34424339125>. For information about the SC, call (301) 496-9156.

## Committee Addresses Aging, Adult Dependent Care Needs

The Office of Personnel Management estimates that 49 percent of the workforce will be expected to provide elder care for a family member, or loved one, within the next 5 years. The Life@NIH Survey, conducted by the NIH child care board, the Office of Research Services and the Office of Human Resources found that 24 percent of participants will be caring for both children and an adult in the near future. The Sandwich Generation—the cohort of employees not only raising children but also providing care to aging parents and relatives—is presented with challenges associated with multi-generational caregiving.

In response to these challenges, ORS has launched the aging and adult dependent care committee (AADCC). Over the next 3 years, AADCC will explore, collect information/data and assess services in order to provide employees with the tools and support systems they need to plan for aging and for providing adult dependent care.

"Offering various workplace flexibilities is essential in recruiting and retaining the most highly qualified workforce at the NIH," said ORS Acting Director Tim Tosten. "It is important to provide to our employees comprehensive services so that they can better manage their complex work and family responsibilities."

If you are currently caring for a loved one, or anticipate caring for someone in the near future, come to a committee meeting and share your needs and challenges. AADCC will meet on a quarterly basis—the next meeting is Tuesday, June 20. If you would like to attend or have questions, email Tonya Lee at [leet2@mail.nih.gov](mailto:leet2@mail.nih.gov).

June 28

## 'MAKING OUR STORIES COUNT'

### Panel To Discuss Sexual & Gender Minority Research Data

"Making Our Stories Count," a panel discussion on better understanding and quantifying lesbian, gay, bisexual and transgender (LGBT) data in the federal workforce, will be held on Wednesday, June 28 from 2 to 3:30 p.m. in Bldg. 40, Rm. 1201.

The discussion, sponsored by the Office of Equity, Diversity and Inclusion and the Sexual & Gender Minority Research Office, seeks to create a better understanding of the NIH workforce as we continue toward our goal of fostering an environment where diverse talent is leveraged to advance health discovery. The event will be accessible to those from both administrative and research perspectives.

Participants include JoAnne Keatley of the Center of Excellence for Transgender Health; Elliot Kennedy, HHS senior advisor for LGBT health; AJ Pearlman of the HHS Office for Civil Rights; Alexandra Chandler of the National Counterintelligence and Security Center; Caroline Vagneron of the World Bank; and Mahri Monson of the Environmental Protection Agency.

For details see <http://edi.nih.gov/pride>. Watch online at <https://videocast.nih.gov/>.

Sign language interpreters can be provided. Those who need reasonable accommodation to participate in this event should contact Bali White at (301) 594-0155 or [Bali.White@nih.gov](mailto:Bali.White@nih.gov).





## Bardakci Readies For Martial Arts Championship

BY ERIC BOCK

If all goes according to plan, Hakan Bardakci will be in Russia this November, competing for a martial arts championship.

In early April, the 33-year-old, a project officer with the Office of Research Facilities, competed in his first-ever national sambo championship outside of Philadelphia. Sambo is a form of martial arts that combines techniques of several other styles including jujitsu

and judo. Invented by the Russian army in the early 1920s, sambo is an acronym for *samozashchita bez oruzhiya*, which means “self-defense without weapons.”

Bardakci made it to the final round of the tournament. To get there, he beat a two-time world champion. He also gained the attention of the coach who selects the national



Hakan Bardakci

PHOTO: ERIC BOCK

team. Competing in the tournament is just one step toward representing the United States in the sambo world championships in Sochi, Russia. Currently, Bardakci works in the Division of Design and Construction Management. He helps with the design of new laboratories and other buildings and oversees their construction. Recently, he led the design and early construction phase of the Northwest Child Care Center. He's also coordinating the design and construction of several projects in Bldg. 13, including the installation of a transmission electron microscope. The 9-year NIH veteran works on an alternative work schedule so he can complete all his job responsibilities and train for competitions.

The national championships were the first time Bardakci competed in a sambo tournament. He was born in the U.S. and grew up in Turkey. Since he was a toddler,



After placing 2nd in his division, Bardakci (1) stands on the awards podium at the 2017 USA National Sambo Championship.

he's been practicing several styles of martial arts, including judo, Greco-Roman wrestling and Brazilian jujitsu. In high school, he was the 4th best judo wrestler in Turkey. He was multi-time Maryland and Virginia state gold medalist in judo.

Bardakci first came to NIH while a student at Catholic University. Back then, he contacted the NIH Judo Club and asked if he could train. Soon after, he began working with the club, including former NIH deputy director Dr. Thomas Malone. There, Bardakci had the opportunity to train with athletes from such places as Eastern Europe, France and Japan. That experience exposed him to different techniques and strategies. Once he graduated from CU, he took a position at NIH.

When not working, he's either training, practicing or recovering. He usually begins his weekend workout on Thursday night. After work, Bardakci stretches, uses an electric muscle stimulation recovery device, practices yoga and does cardiovascular exercises.

The next day, he runs the hills of Sugarloaf Mountain. Afterward, he'll read the latest literature on exercise science and review film of future opponents. At 2 p.m. on Fridays, Bardakci trains for 3 or 4 hours. For example, he'll practice his technique on a doll and then lift conventional weights, rocks or logs. He sometimes employs unorthodox methods that he learned while growing up in Eastern Europe.

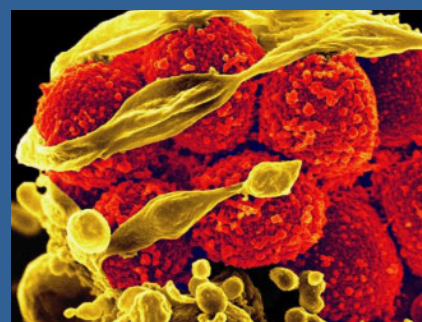
On Saturday, he practices at a local judo or wrestling gym. On Sunday, he invites other wrestlers—“whoever's not injured,” he

said—to his garage, where he set up wrestling mats, or a local gym.

As of now, sambo is not yet approved for the Olympics. If it's ever okayed, Bardakci hopes to compete for a spot on the U.S. team. “That would be super exciting,” he said.

Training takes sacrifice, especially since many of his peers do not work full-time, he explained. If he's not exercising, he's probably sleeping, making a veggie smoothie or watching a movie. He also posts on his blog, sharing insights on health and exercise.

Bardakci believes he's becoming a “more technical martial artist as I get older.” He's figured out how to train without injuring himself and his long tenure in the sport helps during matches. As for how long he'll continue, he promised, “If I'm healthy, I'll be competing.” **R**



ON THE COVER: *Methicillin-resistant Staphylococcus aureus (MRSA) bacteria (yellow, round items) killing and escaping from a human white cell*

IMAGE: NIAID

### The NIH Record

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**Editor:** Rich McManus  
[Rich.McManus@nih.gov](mailto:Rich.McManus@nih.gov)

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

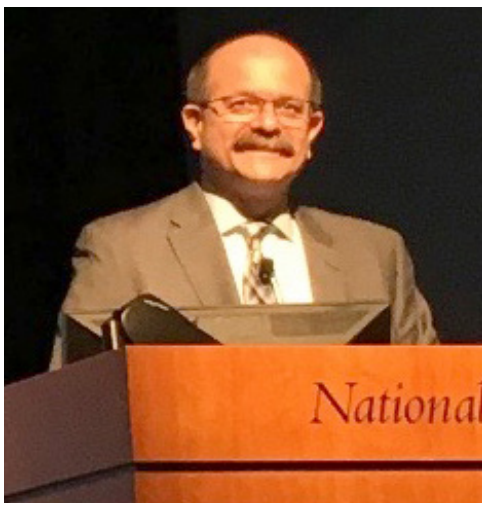
**Staff Writers:**  
Eric Bock • [Eric.Bock@nih.gov](mailto:Eric.Bock@nih.gov)  
Dana Talesnik • [Dana.Talesnik@nih.gov](mailto:Dana.Talesnik@nih.gov)

Subscribe via email: [listserv@list.nih.gov](mailto:listserv@list.nih.gov) Follow: <http://nihrecord.nih.gov/>



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## Schiffman

CONTINUED FROM PAGE 1

to a greater understanding” of the natural history of human papillomavirus, which was tied to the development of cervical cancer by Nobel prize-winning studies in the early 1980s. “I’ve been studying one thing—HPV—for 30 years because I wanted to make an impact.

“Whole new fields are opening up,” he continued. “There is an incredible richness to the continuing story. I know I’ll never get to the end of it, but I’m sticking with it until they carry me out.”

Schiffman’s single-mindedness mirrors that of the lecture’s namesake, from whom he learned an important lesson.

“Sometimes, Dr. Gordon [who died at age 59 in 1985] would fall asleep during meetings. What we didn’t know at the time is that he was dying of cancer. But he never complained. I thought, ‘Damn. This guy is really dedicated.’”

When Schiffman arrived on campus in 1983, having trained in the PHS epidemiology program, he was intimidated. “I remember when I was a first-year fellow. My legs were shaking. I was incredibly fearful that I would have nothing to contribute. Now, I have friends all around me. This is my home.”

Speaking on “The changing epidemiology of HPV and cervical cancer: From etiology, to validation of prevention methods, to dissemination,” Schiffman said that, during the early years of investigation, “I would be so excited that I didn’t know what city I was in.” Back then, the field attracted only a handful of investigators; today’s HPV meetings draw thousands.

★ ★ ★

*“There is an incredible richness to the continuing story. I know I’ll never get to the end of it, but I’m sticking with it until they carry me out.”*

—DR. MARK SCHIFFMAN

★ ★ ★

“The sense of being on a team was wonderful,” he recalled. “We were all looking for a signal in the midst of noise.”

His mentor at Johns Hopkins, where he earned his M.P.H. in epidemiology, was Dr. Abraham Lilienfeld, whose motto was, “Epidemiology is a butcher shop—don’t use a scalpel.” Schiffman said he spent 5 years measuring HPV in all its aspects.

“We were trying to measure without error,” he said. “That kind of work might not even be funded today. We made a lot of mistakes, and we wasted a lot of money, but you need to have that kind of room in order to do a case series—that’s often useful in the search for causation.

“We were obsessed over reducing misclassification,” Schiffman continued. He and his colleagues had to “start over frequently. We kept asking simple questions, knowing that, eventually, the answers would be profound.”

It turns out that there are more than 200 HPVs, only about a dozen of which cause cancer. HPV1, which causes foot warts, and HPV2, which causes warts on fingers, arise with characteristic timing, right about when kids least want to be made fun of in pool locker rooms or middle school hallways. More than 95 percent of cervical cancer cases are linked to HPV; those harboring oncogenes E6 and E7 are the most dangerous. But their invasive work proceeds slowly, over decades.

Early attempts to categorize the disease’s progression, often based arbitrarily on microscopic appearance, turned out to be poorly reproducible and not a true reflection of HPV’s natural history.

“It’s rare for a biomarker to link closely to disease,” Schiffman said. “Most fail as indicators. But there is fierce inertia against changing familiar reference standards...I think we should question all biomarkers, even if they are clinically established, but especially if they represent ‘disease.’ Treat everything as a predictor variable.”

In his view, a good test correctly assigns what action the clinician should take.

Schiffman owned up to “an instructive mistake” involving HPV66. It briefly looked like a reliable signpost to the development of cervical cancer, but eventually failed as a cause.

There may be too many tests and algorithms today, he cautioned. “People can’t keep up.”

But all that testing has led to “a massive evaluation of risk” that is now under way among cancer researchers, Schiffman said. Apps are taking the place of algorithms as clinicians and patients seek simplified recommendations.

Schiffman believes that science can “achieve truly high impact against cervical cancer...There are faster ways than what we are doing, if we’re serious about eradicating cervical cancer.”

He applauded his institute’s acting director Dr. Doug Lowy—himself an HPV researcher—for embracing an eradication approach. Schiffman acknowledged that it will take big resources to go down this path, but said such an effort is justified: “This is a common infection that leads to a common cancer.”

During a brief Q&A, Schiffman got to defend again his preference for frank debate about any scientific finding: “Sometimes I think we don’t argue enough anymore. But it’s just good science. You need those people who want the greater truth.”

He also said that there is an ongoing trial with the Gates Foundation to determine whether current vaccines for HPV indeed last 7-9 years. “I think that’s plenty long enough—you don’t need lifetime durability to fight cervical cancer. But I’m not sure what the case is in men.”

Those who may find themselves a quart low in their zeal for the NIH mission can watch Schiffman’s entire talk at <https://videocast.nih.gov/summary.asp?Live=23318&bhcp=1>. **R**



## NIH'er Flood Loves His 'Extra' Work

BY DANA TALESNIK

Some of us fantasize about becoming a rock star or pro athlete but never try to turn our hobby into that dream job. NIH's Daryl Flood aspires to be an actor; in the meantime, he's dabbling in the world of film and television as an extra.

Flood currently can be spotted on the Netflix TV series *House of Cards* and appeared in the recent HBO film *The Immortal Life of Henrietta Lacks*. He credits his experience working at NIH as enhancing his skill set and knowledge base toward a future acting career.

"I like seeing first-hand what NIH does on a big scale," said Flood, who is a record and information management specialist for the Executive Secretariat in OD. "I wouldn't possibly have known about *Henrietta Lacks* if I had not managed records for [NIH director] Dr. [Francis] Collins."

In the film, Flood appears in a scene at the pier where Deborah Lacks, played by Oprah Winfrey, meets her mother's biographer Rebecca Skloot, played by Rose Byrne. The scene was filmed outside the Myers Museum in Baltimore over 2 days.

"Prior to my even knowing about the movie, I would tell people about *Henrietta Lacks*, that she was a poor African-American female and all the contributions to the medical and scientific world because of her," said Flood. "I would say, 'As an African-American, you should know something about her and her legacy.'"

At NIH, Flood regularly handles records related to *Lacks*, whose cancer cells were taken without her knowledge for study more than 60 years ago and still live, and reproduce, to this day. These "HeLa cells" have contributed to major medical advances against a backdrop of bioethical and legal issues. The immortal cell line "is kind of like a miracle," said Flood, who hopes the movie brings more attention to her story.

"I think all of the bases were covered in the movie with the family issues and, in layman's terms, the science," said Flood. He remembers seeing several *Lacks* family members come in to talk with Collins in recent years and said he's glad to learn that



Daryl Flood of Exec Sec has dual lives and looks as federal employee and movie extra.

PHOTOS: DANA TALESNIK



NIH was working with her family, trying to right a wrong.

Born and raised in the Washington area, Flood started out doing some modeling before looking for reputable casting agencies. He has enjoyed observing different aspects of film production while on the sets of several movies and smaller indie films. It's not all glamorous though. He recounted spending 2 days in discomfort, wearing a tight midshipman's uniform, in the film *Annapolis*.

Being an extra takes a lot of patience. Extras spend several days repeating their scene many times for what may only be a few seconds of film time, if it even makes the cut. "You really have to want to do it," said Flood. "That's what I realized even in doing a couple of projects...Any opportunity I get into, I never complain."

What's stopping him from moving to Los Angeles or New York to pursue an acting career? "I can't move right now," said Flood, who has six children, ranging in age from 3 to

17. "I'm the modern-day Mike Brady [of TV's *The Brady Bunch*]," he quipped. "I've got to raise them. But once they're all grown, I'm off!"

Until Flood can move, he's content doing small projects and taking improv classes while hoping to get lead roles someday. "I'm preparing myself to be like Idris Elba," he said with a laugh. "I'm going to the gym, preparing for the future and for bigger opportunities. I try to do what I can do here in the meanwhile just to stay in the scene and stay in the know."

Flood finds that acting occasionally helps him get through life's challenges. "Sometimes I have to put on a happy face and play the role," he said.

One thing he's learned, he said, is always to have faith. "There are many times I could've given up and lost faith, especially at times when I was between jobs. Whatever your goal is, just do it! Start it as a hobby...If this is something you would do for free and love to do, eventually it's going to pay you...I'm a spiritual person and I don't give up." [R](#)

## NINDS's Hallett Receives Honorary Degree in Hamburg

Dr. Mark Hallett, chief of the Medical Neurology Branch and the human motor control section in the NINDS Division of Intramural Research, was awarded an honorary degree from the medical faculty of the University of Hamburg in Germany during the Hamburg Neuroscience Symposium

on May 2. He was recognized as an outstanding scientist whose groundbreaking scientific work in the fields of human systems neuroscience and neurology—especially on motor control and movement disorders—has contributed significantly to the progress of neuroscience.



Hallett earned undergraduate and medical degrees from Harvard University and received his neurology training at Massachusetts General Hospital. Before joining NIH in 1984, Hallett was chief of the Clinical Neurophysiology Laboratory at Brigham and Women's Hospital in Boston and associate professor of neurology at Harvard Medical School. Currently, his work centers on understanding the physiology of normal human voluntary movement and the pathophysiology of different movement disorders.



NIH director Dr. Francis Collins and Mukherjee share a light moment during the conversation portion of the Big Read. Below, the author meets lecture guests and signs copies of his book in the NIH Library.

PHOTOS: BILL BRANSON

## Mukherjee

CONTINUED FROM PAGE 1

If the human genome’s 3 billion letters were printed in standard font, he said, it would span 70 sets of an encyclopedia. But the difference between you and a random stranger might amount to less than a book, and the relative difference between you and your sibling with a genetic disease might be just a couple of letters.

“If you had the capacity, as we now do, to select certain volumes or potentially change—going through that encyclopedia collection and go to page 373, volume 7—one letter to another letter, and do so in a way that might have permanence for human beings, the question is: would you do it, under what circumstances and what are the limits and constraints—scientific, social and ethical?”

The ability to add or subtract genes holds the promise of treating, if not curing, disease and alleviating human suffering, said Mukherjee. But editing genes also opens the door to such controversial issues as selective breeding, genetic enhancement and cloning.

“If you think more deeply about genes,

you realize that...you could move some forward into next generations while eliminating, or rejecting others, and thereby lay the basis for a powerful method...to create better human beings.”

But history has shown a dangerous side of eugenics, from the late Carrie Buck, who was sterilized against her will in 1927 because it was believed she carried a genetic propensity for imbecility—and for whom *The Gene* is partly dedicated—to Nazi genocide.

“As we [move] forward with our enthusiasm for the new genetics or changing the human genome for selecting healthy, happy new children, eliminating genetic diseases,” said Mukherjee, remember that eugenics “in fact should remain as a line on our spines to remind us that this history is very recent.”

During his discussion with Collins, Mukherjee said, “It’s not clear to me at all that individuals will act in any interest outside the self-interest of bearing what they consider the best child, the most prosperous

child they could have. The question that faces our generation now...is should we enter these waters and how deeply?”

Mukherjee said he predicts the first genetically enhanced human will be born in the next generation, with the experiment revolving around height. “I was not enhanced!” interjected Collins, to laughter.

There’s a healthy dose of history and science in Mukherjee’s 500-page tome, but his writing style makes *The Gene* accessible. “The most important thing in [writing] a book like this is to remember that every page has to have a human story,” he told Collins.

Unlike *The Emperor of All Maladies*, which began with stories of cancer sufferers and later explained the science, *The Gene* puts the science up front. “You need the vocabulary to make it to the second half of the book,” he said, to get to the questions that reverberate outside of medicine.

“But if you put in too much scientific information, the most important readers of this book will be lost,” he said. “You don’t [want to] write a book that will sit in the library of a cancer center and never be picked up. I wanted to stimulate a conversation that was wider.”

As technology progresses, so must dialogue about the bioethics and boundaries of germline manipulation.

“I want us to think and pause before we move forward,” Mukherjee concluded. “I’m a physician, so the idea of the suffering of people, partly caused by genes—cancer is a great example—is not lost on me. The capacity to alleviate that suffering, as someone who belongs to a family where genes have played a disproportional and rather cruel twist, is not far from me. I remind people that my stakes in this are just as human as anyone else’s.”







## Baby Teeth Link Autism and Heavy Metals, Study Suggests

Baby teeth from children with autism contain more toxic lead and less of the essential nutrients zinc and manganese, compared to teeth from children without autism, according to a study funded by NIEHS. The researchers studied twins to control genetic influences and focus on possible environmental contributors to the disease.

The findings, published June 1 in the journal *Nature Communications*, suggest that differences in early-life exposure to metals, or more importantly how a child's body processes them, may affect the risk of autism.

The differences in metal uptake between children with and without autism were especially notable during the months just before and after the children were born. The scientists determined this by using lasers to map the growth rings in baby teeth generated during different developmental periods.

The researchers observed higher levels of lead in children with autism throughout development, with the greatest disparity observed during the period following birth. They also observed lower uptake of manganese in children with autism, both before and after birth.

The pattern was more complex for zinc. Children with autism had lower zinc levels earlier in the womb, but these levels then increased after birth, compared to children without autism.

The researchers note that replication in larger studies is needed to confirm the connection between metal uptake and autism.

"We think autism begins very early, most likely in the womb, and research suggests that our environment can increase a child's risk. But by the time children are diagnosed at age 3 or 4, it's hard to go back and know what the moms were exposed to," said Dr. Cindy Lawler, head of the NIEHS Genes, Environment and Health Branch. "With baby teeth, we can actually do that."

The method of using baby teeth to measure past exposure to metals also holds promise for other disorders, such as attention deficit hyperactivity

disorder. "There is growing excitement about the potential of baby teeth as a rich record of a child's early-life exposure to both helpful and harmful factors in the environment," said Dr. David Balshaw, head of the NIEHS Exposure, Response and Technology Branch, which supported the development of the tooth method.

## Mycobacteria Use Protein to Create Diverse Populations, Avoid Drugs

Subgroups of tuberculosis (TB)-causing bacteria can persist even when antibiotics wipe out most of the overall population. The need to eliminate these persistent subpopulations is one reason why TB treatment regimens are so lengthy. Now, researchers have shown that a single protein allows mycobacteria to generate diverse populations that can avoid TB drugs. The protein may be a target for intervention; blocking it might result in less mycobacterial diversity and shorten TB treatment courses. The research was supported by NIAID and appeared in *Nature*.

Dr. Eric J. Rubin of Harvard T.H. Chan School of Public Health and Dr. E. Hesper Rego of Yale University School of Medicine and their coworkers first studied *Mycobacterium smegmatis*, a close relative of *Mycobacterium tuberculosis (Mtb)*, the microbe that causes TB.

Using fluorescent reporter molecules and time-lapse microscopy, they examined individual cells as they grew and divided. Mycobacteria can generate daughter cells through asymmetric growth, resulting in genetically identical, but physiologically diverse, populations. The mechanisms underlying this ability and the extent to which the cells' size, growth rate and other physiological properties relate to survival in mycobacterial populations were not well understood.

Rubin and colleagues determined that the protein product of a single gene, *lamA*, is a member of the protein machinery that is active when mycobacteria divide. The protein—which is not known to exist in other rod-shaped bacteria or other organisms—seems to allow for asymmetrical growth in new mycobacterial cells made during cell division. The asymmetrical growth leads to bacteria with wide variations in physiological properties and susceptibility to antibiotics.

In experiments using *Mtb*, the scientists found that mycobacteria without *lamA* formed far less diverse bacteria with more uniform susceptibility to antibiotics. When exposed to the front-line TB drug rifampicin, for example, *Mtb* cells lacking *lamA* were less able to survive than wild-type bacteria. In the future, it may be possible to devise ways to inhibit *lamA* or its protein. This could lead to reduced variation in *Mtb* populations and, potentially, to more uniform vulnerability to drugs, according to the scientists.

## NIH Researchers Find Potential Genetic Cause of Cushing Syndrome

A small study by researchers at NIH suggests that mutations in the gene *CABLES1* may lead to Cushing syndrome, a rare disorder in which the body overproduces the stress hormone cortisol. The study appeared online in *Endocrine-Related Cancer*.

The excess cortisol found in Cushing syndrome can result from certain steroid medications or from tumors of the pituitary or adrenal glands. Symptoms of the disease include obesity, muscle weakness, fatigue, high blood pressure, high blood sugar, depression and anxiety.



Researchers at NICHD, in collaboration with other institutions in the United States, France and Canada, scanned tumor and cell tissue from 146 children with pituitary tumors evaluated for Cushing syndrome at the Clinical Center. Researchers also scanned the genes of tumors from some of the children. Investigators in France scanned the genes of an additional 35 adult patients with Cushing syndrome and pituitary tumors.

The research team found that four of the patients have mutant forms of *CABLES1* that do not respond to cortisol. This is significant because, when functioning normally, the *CABLES1* protein, expressed by the *CABLES1* gene, slows the division and growth of pituitary cells that produce the hormone adrenocorticotropin (ACTH).

In turn, ACTH stimulates the adrenal gland to produce cortisol, which then acts on the pituitary gland to halt the growth of ACTH-producing cells, effectively suppressing any tumor development. Because cortisol does not affect the four mutant forms of *CABLES1* discovered by the researchers, these genes leave production of ACTH-releasing cells unchecked.

"The mutations we identified impair the tumor suppressor function in the pituitary gland," said the study's senior author Dr. Constantine Stratakis, director of NICHD's Division of Intramural Research. "This discovery could lead to the development of treatment strategies that simulate the function of the *CABLES1* protein and prevent recurrence of pituitary tumors in people with Cushing syndrome."



At left, NIGMS's Dr. Mike Sakalian (l) and NLM's Dr. Valerie Virta (rear) kept busy at the BTWD registration table. Each participant who signed in at the Bldg. 1 pit stop received a free T-shirt. At center, two perennial Bike To Work Day faces—newly retired NIH photographer Bill Branson and Diane Baker, who usually rides in with husband NIH director Dr. Francis Collins—enjoy festivities. At right, Mike Butchko, owner of The Bicycle Place in Silver Spring, repairs a bicycle.

PHOTOS: DANIEL SOÑE

## Bike to Work

CONTINUED FROM PAGE 1

commuters from passing through three NIH-affiliated “pit stops.”

According to the Metropolitan Washington Council of Governments, which sponsors BTWD in the national capital region, NIH had 537 participants registered for the May 19 event. An additional 70 NIH bicyclists registered at the Bldg. 1 pit stop, bringing total NIH BTWD participation to 607.

At the Bldg. 1 site, 346 riders stopped to grab breakfast and a T-shirt or get their bike tuned up. NCI had 49 participants, the most of any IC. NIHBC and ORS's Division of Amenities and Transportation Services organized the annual event.

The other two NIH-affiliated BTWD pit stops were Rockledge Dr. at Rock Springs Business Park and Falls Grove Village Center, near NCI-Shady Grove in Rockville.

Diane Baker gave brief remarks at the Bldg. 1 event. She spoke on behalf of her husband, NIH director Dr. Francis Collins, who couldn't attend. They are both avid cyclists themselves.

“Bike to Work Day is something Francis and I really enjoy,” she said. “It's not always easy, but it is always fun. And I just want you to hear from both of us how much we support this kind of activity.”

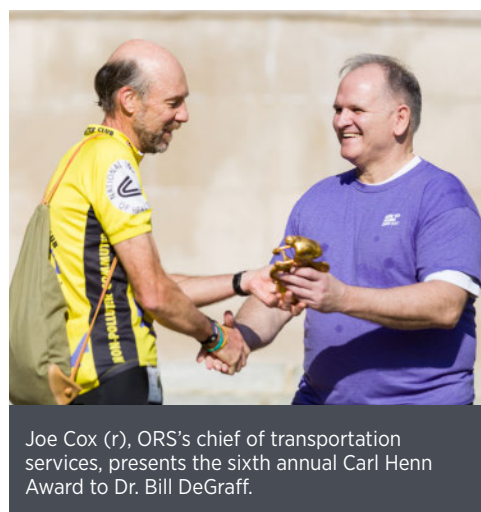
After Baker spoke, Joe Cox, ORS's chief of transportation services, presented the sixth annual Carl Henn Award to Dr. Bill DeGraff, a retired scientist in the Radiation Biology

Branch at NCI. Henn, who passed away in 2010, was a co-founder and president of the NIHBC and a dedicated environmentalist. The award is given to someone who exemplifies his values.

“Bill was one of the original pillars of the NIH bike club,” said Cox. “He was treasurer for years and he was at every meeting I ever went to with the bike club. He's a nice guy. I really enjoyed being around him. He's quiet and not a very outspoken enthusiast, but he was always there to show you his passion.”

Although he's been retired for almost a year and a half, DeGraff still enjoys coming back on campus to help out with Bike to Work Day and catching up with his former colleagues.

“It's nice to be recognized for the things you do and I stand in very good company”



Joe Cox (r), ORS's chief of transportation services, presents the sixth annual Carl Henn Award to Dr. Bill DeGraff.

with previous Henn award winners, he said. “I really appreciate this.”

For those interested in pedaling to work, NHGRI's Peter Chines suggests a visit to the NIHBC web site at <http://www.nihbike.com/>. There, users will find resources they need to saddle up. They can also join a listserv or look up the contact information for ride mentors, volunteers familiar with myriad commutes between neighborhoods and NIH. “We're excited to help new bike commuters,” Chines said.

NLM's Dominic Napoli rode his e-bike into work. The bike features a battery-powered electric motor. When the motor turns on, he explained, it's like “someone getting behind and pushing you.” E-bike riders don't have to pedal as hard up hills and they don't slow down when they coast.

This year, the longest commute of the day belonged to NINDS's Jim Nagle. He rode in from Reston, Va., and his round trip was 47 miles. The total combined round trips of those who commuted to the Bldg. 1 pit stop was 4,000 miles.

For Cox, advocating for bikers on campus is a “no-brainer.” He noted, for example, that 15 bikes can fit in two parking spaces. There are plenty of bike racks and lockers around campus. Biking to work also has environmental and health benefits.

And there's another benefit for those who aren't morning people: “You don't need a parking spot, so you can come in anytime you want,” Cox said. **R**





At left, NIAMS scientific director Dr. John O'Shea (l) joins NIH deputy director for intramural research Dr. Michael Gottesman, NINR scientific director Dr. Ann Cashion and NINR director Dr. Patricia Grady. At right, NINR researcher Dr. Ana Diallo presents her work during the symposium's poster session.

PHOTOS: CHIA-CHI CHARLIE CHANG

## NINR Intramural Program Holds Scientific Symposium

NINR's Intramural Research Program (IRP) recently hosted a scientific symposium—Symptom Science Research: A Path to Precision Health—on campus. It highlighted NINR's intramural scientific advances and collaborations across NIH and other organizations. Several hundred scientists, health care professionals, students and members of the public attended the event either in person or via live video streaming.

NINR director Dr. Patricia Grady opened the event, noting that “the NINR Division of Intramural Research has built a strong scientific program by supporting research conducted on the Bethesda campus that focuses primarily on understanding the underlying biological mechanisms of a range of symptoms, their effect on patients and how patients respond to interventions.”

Presenting the keynote address, NIH deputy director for intramural research Dr. Michael Gottesman set the tone of the day by reflecting on the history of NINR, including its founding as the National Center for Nursing Research and its transition to an NIH institute. Gottesman noted NINR's collaborations with other ICs to examine the link between disease and care, highlighting the institute's work in partnership with NIAID managing the care of people with AIDS and with NCI addressing symptom management in cancer patients.

Three scientific panels, moderated by investigators from NINR's IRP, brought together experts to discuss their research on the gut-liver-brain axis, fatigue and brain injury.

The first of the day's three panels focused on the role of the gut-liver-brain axis on inflammation, addiction and infection. Dr. Wendy Henderson moderated and was joined by Dr. Colleen Hadigan (NIAID) and Dr. Lorenzo Leggio (NIAAA/NIDA).


Dr. Leorey Saligan moderated the second panel and examined the role of inflammatory and glutamatergic pathways on fatigue. He was joined by Dr. John O'Shea (NIAMS) and Dr. Carlos Zarate, Jr. (NIMH).

Closing out the symposium, Dr. Jessica Gill

moderated the final panel, which explored the identification of biomarkers to potentially improve the care of patients with brain injuries. She was joined by Dr. Dimitrios Kapogiannis (NIA) and Dr. Robert Stern (Boston University School of Medicine).

The symposium included a poster session, highlighting research conducted by NINR's intramural fellows and trainees along with collaborating scientists from the NIH community.

After the scientific presentations and discussions, NINR scientific director Dr. Ann Cashion closed the day, noting that it was “a wonderful demonstration of collaboration among multiple disciplines and multiple investigators, all working in the area of clinical research, hoping to find treatments and interventions that will actually improve patient care and patient outcomes.”

To view the full symposium, visit <https://videocast.nih.gov/summary.asp?Live=21623&bhcp=1>. 

## Kearney Named Distinguished Alumna

Dr. Marguerite Littleton Kearney, director of NINR's Division of Extramural Science Programs, has been named the recipient of Augusta University College of Nursing's (formerly the Medical College of Georgia College of Nursing) Phoebe Kandel Rohrer Distinguished Alumna award. It was presented during the university's recent alumni weekend.

Kearney leads the activities of the division, which includes the Office of Extramural Programs, the Office of End-of-Life and Palliative Care and the Office of Extramural Research Administration.

In addition to her B.S.N. and an M.S.N. in adult care/trauma nursing from Augusta University, Kearney holds a Ph.D. from Rush University. Her area of research interest is in the effects of female hormones on cerebrovascular recovery after cerebral injury.



## Johnson Appointed NIH Deputy Director for Management

Dr. Alfred Johnson has been named NIH deputy director for management. He had been serving as acting DDM since May 2016.

Before joining the Office of the Director leadership team, Johnson was director of the Office of Research Services, a

position he held since 2006. In that post, he planned and directed service programs for public safety, security operations, scientific and regulatory support and a variety of other programs and employee services.

Before joining ORS, Johnson held several leadership positions at NIH including assistant director in the Office of Intramural Research, acting director of the Office of Loan Repayment and Scholarship and principal investigator (1996-2007) in the Laboratory of Molecular Biology, Center for Cancer Research, National Cancer Institute. He joined NIH in 1985 as an American Cancer Society postdoctoral fellow.

Johnson received a bachelor of arts in chemistry at Albany State University (Ga.) in 1979. He completed his Ph.D. in biomedical sciences at the University of Tennessee in 1985, and conducted his doctoral research at the biology division of Oak Ridge National Laboratory.





Dr. Louise Brinton

## NCI's Brinton Bids Farewell to DCEG

BY JENNIFER LOUKISSAS

In a research career spanning four decades, Dr. Louise Brinton made contributions to advance the health of women in the United States and around the world. She retired from federal service at the end of April.

Dr. Brinton practiced—and taught—hands-on epidemiology, leading field investigations on nearly every continent, from Latin America to West Africa, China to multiple U.S. locales. To each project, she brought a unique curiosity, sense of adventure and love of travel and cultural exchange.

She began her graduate work in anthropology at the University of North Carolina at Chapel Hill, but quickly switched to epidemiology. In 1976, she came to NCI, to what is now the Division of Cancer Epidemiology and Genetics (DCEG), as a predoctoral fellow. She earned a Ph.D. in epidemiology from Johns Hopkins School of Hygiene and Public Health in 1979, and subsequently conducted postdoctoral research at Oxford University in the United Kingdom under the tutelage of Sir Richard Doll, before returning to NCI.

In 1984, she was appointed acting chief of the environmental studies section and in 1996 became chief of the Environmental Epidemiology Branch, later renamed the Hormonal and Reproductive Epidemiology Branch (HREB). In 2016, she was named DCEG's first scientific advisor for international activities.

"Louise initiated and conducted seminal research studies to identify etiologic factors responsible for breast cancer and other gynecologic malignancies," said DCEG founding director Dr. Joseph Fraumeni, Jr. "Over two decades at the helm of HREB, she shepherded scores of projects from pilot phase, through the development of rigorous protocols, resulting in well-designed and fruitful studies, many of which will remain in use for the next generation of epidemiologists."

That body of work is represented in the more than 600 peer-reviewed scientific manuscripts she authored and dozens of book chapters, most of which focus on the etiology of breast, endometrial and rarer gynecologic cancers, as well as male breast cancer and hormonal factors influencing those malignancies.

When asked which study she is most proud of, she quickly names the Invasive Cervical Cancer Study in Latin America. Women in Latin America experience some of the highest rates of cervical cancer in the world. The team hypothesized that sexual behavior among the men was responsible for the extremely high rates; they designed a study to identify the contribution of male sexual behavior.

Brinton and her colleagues set out to conduct the first large-scale epidemiological study of invasive cervical cancer in that part of the world, complete with biological samples and—to the surprise of many—complete sexual histories from both men and women in the study.

"She was at the forefront of attempts to identify the viral etiology of cervical cancer," recalled Dr. Robert Hoover, director of the DCEG Epidemiology and Biostatistics Program, a life-long mentor to Brinton. "Her efforts laid the groundwork for future studies that, with improved assays, definitively established HPV as the causal agent in cervical carcinogenesis."

In the various leadership roles she held in DCEG

over the years, Brinton recruited investigators who have become leading experts in the epidemiology of gynecological cancers. Her trainees have gone on to direct research efforts within DCEG and at leading departments of epidemiology across the country.

In addition to her research, Brinton served on the executive board of the Society for Epidemiologic Research and was elected its president in 1990. She is the recipient of the Public Health Service Special Recognition Award and the NIH Director's Award for innovative leadership in women's health research and the H.A. Tyrler Distinguished Alumni Award from UNC. The American College of Epidemiology honored her with the 2009 Abraham Lilienfeld Award and in 2015 she received the Career Accomplishment Award from the Society for Epidemiologic Research.

Brinton has served as a senior editor for *Cancer Epidemiology, Biomarkers and Prevention* and on the editorial board of the *Journal of the National Cancer Institute*, *Breast Cancer Research* and the *International Journal of Epidemiology*. She has also been a member of and led many national and international committees to assist in determining future directions of research in cancer epidemiology.



Dr. Philip Taylor

## After 34 Years, Taylor Retires From NCI

BY JENNIFER LOUKISSAS

Dr. Philip Taylor retired from the National Cancer Institute in May after 34 years of distinguished service. He devoted his career to the conduct of epidemiological studies to inform cancer prevention strategies for malignancies of the upper gastrointestinal (UGI) tract, including esophageal and gastric cancers.

His work involved a variety of research approaches, including cancer prevention trials, early detection

## Constant Heads NIGMS Review Office

Dr. Stephanie L. Constant is new chief of the Office of Scientific Review, NIGMS. She oversees OSR as it plans, conducts and coordinates the scientific and technical merit review of research grants, cooperative agreements and training grant applications, including those designed to increase diversity in the research workforce, and assures that these reviews are of a uniformly high quality. Constant joins NIGMS from NHLBI, where she served as a scientific review officer. She earned a B.S. in biology and a Ph.D. in immunology and parasitology, both from the University of York in the United Kingdom. She conducted postdoctoral research at Yale University School of Medicine and was a tenured associate professor at George Washington University prior to joining NIH.





studies, etiologic studies, laboratory-based molecular research and clinical nutrition studies.

“Phil brought a quiet authority to his work, and engendered an atmosphere of collaboration and team science,” said Dr. Margaret Tucker, director of the Human Genetics Program and former chief of the Genetic Epidemiology Branch, where Taylor was a senior investigator for most of his career.

Recently, he had focused on identifying germline variants of susceptibility to UGI cancers through genome-wide association and family studies, evaluating tissue alterations in UGI cancers and pre-malignancy and integrating germline and somatic data with functional genomics to understand etiology and identify biomarkers for early detection and prognosis.

Taylor was pivotal in the launch of the Nutrition Intervention Trials in 1985, two randomized interventional trials involving 32,000 residents of Linxian, China, to evaluate the effects of vitamin and mineral supplementation on total mortality and total and cause-specific cancer mortality in a rural Chinese population.

After the intervention phase ended in 1991, Taylor and colleagues determined the micronutrient combination of selenium/vitamin E/ $\beta$ -carotene reduced total mortality, total cancer mortality and gastric cancer mortality. The protective effects of the intervention have lasted more than two decades. These subjects continue to be followed and serve as one of the most important cohorts for the study of upper GI cancer.

In addition to his research, Taylor had been a mentor to scores of trainees, some here for short visits, others who completed postdoctoral training with him and went on to be life-long collaborators.

During a visit to DCEG in April, Dr. You-Lin Qiao, professor and director of the department of cancer epidemiology at the National Cancer Center/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, reflected on Taylor: “Phil was my first American mentor. We have kept our partnership over many years. Now, in my role at the Cancer Hospital in China, I send students to Phil and to the NCI for training. I credit Phil and the NCI for setting me on the track to my career in research, which began at NCI in 1989 with our collaboration on lung disease and health.”

Taylor received his medical degree from the University of Iowa in 1973 and completed his residency in internal medicine at Vanderbilt University in 1976. He joined the Centers for Disease Control in 1976 as an Epidemic Intelligence Service officer and, while there, completed a residency in preventive medicine.

He received his master’s and doctoral degrees in epidemiology from Harvard School of Public Health and came to NCI in 1983. He was chief of the Cancer Prevention Studies Branch from 1987

to 2004, before joining the Genetic Epidemiology Branch in 2005, and the Metabolic Epidemiology Branch in 2016.

In retirement, Taylor will serve as a special volunteer in the division.



Dr. Marian Willinger

## NICHD’s Willinger, Champion of ‘Back to Sleep’ Campaign, Retires

Dr. Marian Willinger, who was instrumental in the launch of the Back to Sleep awareness campaign in 1994, retired on May 31 from the National Institute of Child Health and Human Development. Back to Sleep, now called Safe to Sleep, is widely credited with reducing the rate of sudden infant death syndrome (SIDS)-related deaths in the United States by more than half.

Willinger began her NIH career 30 years ago at the National Institute of Allergy and Infectious Diseases, as a program officer for AIDS research. In 1989, she joined NICHD, where her passion for maternal and child health led to an opportunity to expand NIH-funded research on SIDS, stillbirth and other causes of infant death.

Willinger has served as a SIDS expert ever since, serving on numerous groups and committees dedicated to saving infant lives. She has received several awards during her career, including the NIH Director’s Award and the HHS Secretary’s Award for Distinguished Service. **R**

## People with African Ancestry Sought

NHLBI is seeking healthy volunteers with African ancestry, 18-50 years of age, to participate in a study researching the role of our genes in blood vessel regulation and blood diseases. Participants will provide a saliva sample in person or through the mail. Compensation may be provided. For more information, contact the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Read about the study at <http://go.usa.gov/xr5sH>. Refer to study 16-H-0065.

## NIAID Seeks Healthy Volunteers

NIAID researchers seek healthy volunteers, 18-50 years old, for an investigational vaccine study targeting RSV. Compensation is provided. For more information, call 1-866-833-5433 (TTY 1-866-411-1010). Email [vaccines@nih.gov](mailto:vaccines@nih.gov) or visit <http://bit.ly/2nOkOvY>.

## People with Anxiety Needed

NIMH is studying people with anxiety and how they respond to stressful events. Researchers are seeking those with general anxiety, panic and/or social anxiety disorder. Study requires one to two outpatient visits to the Clinical Center. Compensation will be provided. For more information, call 1-866-444-2214 (TTY 1-866-411-1010) and refer to study 03-M-0093.

## Parkinson’s Disease Study

NINDS researchers seek volunteers who have had Parkinson’s disease for less than 5 years to participate in a study testing whether N-acetylcysteine (NAC) has a particular effect on brain chemistry. Researchers are evaluating whether NAC can protect the nerve cells in the brain that control brain movement. Compensation is provided. To learn about participating, call 1-866-444-2214 (TTY 1-866-411-1010) or visit <https://go.usa.gov/xXSsQ>. Refer to study 17-N-0076.

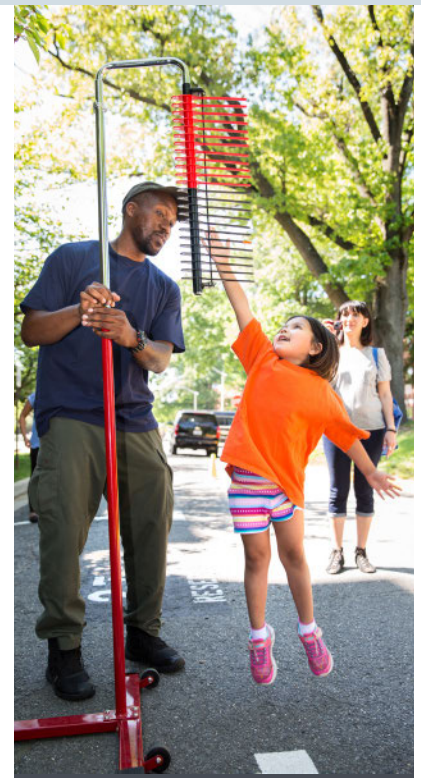
## Diagnosed with Stomach Cancer?

Have you been diagnosed with stomach cancer? NCI researchers at the Clinical Center need volunteers 18 or older with stomach cancer that has spread to the abdomen for a study at the Clinical Center combining surgery with heated chemotherapy as a potential new treatment for stomach cancer. For more information, call the Office of Patient Recruitment, 1-866-444-2214 (TTY 1-866-411-1010). Learn more online at <https://go.usa.gov/xXnqK>. Refer to study 17-C-0070.





ABOVE: MPO Brian Sims (l) and Sgt. Herman Bartz, both of NIH, fascinate little ones by showing how police specialty equipment is worn. At right, Sims and Cpl. Ken Matney of the Rockville Police Department display some of the other tactical gear and devices they use. BELOW: NIH Police Chief Al Hinton greets visitors from the NIH daycare.



Above, Cpl. Kweku Pesseh of NIH shows a tiny recruit the Vertical Challenger. "It measures vertical jump and reach," he explains. "The kids were doing the same test current Special Response Team officers have taken." Below, Cpl. Christine Fedorisko of NIH puts a youngster through his paces at the Police Awareness Day event.

### 23rd Police Awareness Day Features Demos, Displays

The NIH Police hosted the 23rd annual Police Awareness Day on May 17 in front of Bldg. 1. Various local, state and federal law enforcement agencies attended the event, which included K-9 demonstrations, officers on horses, a cookout and various other activities. The day was a big hit with special guest attendees from Parents of Preschoolers, Inc. Youngsters engaged with officers, took part in mock training exercises and met police horses and dogs.



Deputy Sheriff C. Meiklejohn of Montgomery County engages youngsters at Police Awareness Day event. At right, law enforcement officers from several local, state and federal jurisdictions joined in NIH's event. Shown are (from l) Maryland State Trooper J. Quase, Matney, Officer Dana Stroman of Montgomery County PD and Cpl. Ronald Malcom of NIH PD.

PHOTOS: CHIA-CHI CHARLIE CHANG



At left, Officer K. Bauer of the Metro Transit Police gives the ever-popular K-9 demonstration. At center and right, officers on horseback greet visitors of all ages on the lawn in front of Bldg. 1.

