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EINSTEIN

THE MAGAZINE FOR ALUMNI AND FRIENDS OF ALBERT EINSTEIN COLLEGE OF MEDICINE



LIVING WITH *LUPUS*

Einstein and Montefiore scientists
help patients find relief from the pain

A Message from the Dean

When Einstein students graduate this May, the occasion will mark the 60th anniversary of our first commencement. Even more significant, those newly minted physicians and scientists will be the first to receive diplomas from Einstein as an independent academic institution with the authority to confer its own medical and graduate degrees, which will bear the new and distinctive “Einstein seal.” (See more about this on page 11.) Few events in the College of Medicine’s 64-year history are so important. This further solidifies our collaboration with Montefiore and helps ensure our future as a top-tier medical school and leading biomedical research institution.

Our cover story (page 22) is a great example of this collaboration. It describes the effort by Einstein and Montefiore rheumatologists to better diagnose and manage lupus, a chronic autoimmune disease that inflames and damages tissues and organs. Lupus primarily affects young women, particularly those of color. Einstein’s Irene Blanco, M.D., who directs the adult lupus clinic at Montefiore, is working to recruit more minority lupus patients for clinical trials.

The lupus article also describes the essential care offered by physicians working in the Lupus Nephritis Clinic at Children’s Hospital at Montefiore. Promising research led by Chaim Putterman, M.D., chief of rheumatology at Einstein and at Montefiore, may one day allow skin cell analyses to replace invasive kidney biopsies.



Another article focuses on unlocking the secrets of the human brain (page 36). It describes the work of four Einstein researchers who are using optogenetics to reveal how the cerebellum is linked to addiction, how the hypothalamus controls behavior, and more.

As I’ve told our students and faculty many times since I arrived on campus last July, these are exciting times to be in science and medicine. The work we do can profoundly influence people’s lives for the better—and there is nothing more rewarding than that.

GORDON F. TOMASELLI, M.D.
*The Marilyn and Stanley M. Katz Dean
Albert Einstein College of Medicine
Executive Vice President, Chief Academic Officer
Montefiore Medicine*

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ON THE COVER: Cynthia Vasquez at home with her son, Daniel. Cynthia was diagnosed with lupus late in her pregnancy. Einstein and Montefiore doctors have helped relieve her severe pain and prevent serious complications of the disease. See article, page 22.



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GETTING PREPPED FOR

SUCCESS



Einstein's intensive program helps underrepresented students earn places in biomedical graduate schools

BY MANDY WALKER

When Schnaude Dorizan was a senior at the University of Maryland, Baltimore County, she thought her good grades and double major in biology and psychology would ensure her admission to a neuroscience graduate school program—until all eight schools she applied to rejected her.

A professor said her lack of lab research experience was the likely culprit, and suggested she look into the Postbaccalaureate Research Education Program, commonly known as PREP, offered at certain universities and medical schools and funded by the National Institutes of Health (NIH).

MORE SCIENCE TRAINING

Ms. Dorizan, born in Haiti and raised in Brooklyn, was one of only five people accepted into Einstein's first PREP class in 2013. Like many PREP scholars, Ms. Dorizan is a first-generation college graduate. PREP helps students from groups underrepresented in biomedical, clinical, behavioral, and social science

At left, PREP students gather for their weekly chat with Drs. Myles Akabas and Victoria Freedman, both seated in armchairs.



SCHNAUDE DORIZAN
Member of first PREP class,
now at Northwestern University

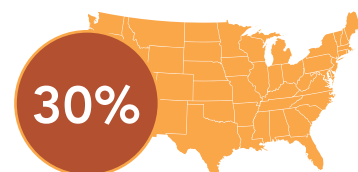
Photo: Matt Oh, Ph.D.

fields become successful applicants for Ph.D. or M.D./Ph.D. programs in the biomedical sciences. African Americans, American Indians, and Hispanics together represent about 30 percent of the U.S. population. Yet less than 9 percent of Ph.D. recipients in science, technology, engineering, and math fields belong to those minority groups, according to a 2012 survey.

The PREP program provides each student with a mentor, a stipend to help pay for living costs, a laboratory research project, and help with graduate school applications.

“These students learn enough about science in their undergraduate institutions to realize they want to become scientists, but need more training,” says Myles Akabas, M.D., Ph.D., professor of physiology & biophysics and co-director of Einstein's PREP program. “They didn't have time to do actual lab research and to master the skills needed to become successful graduate school

UNDERREPRESENTED IN BIOMEDICAL RESEARCH



of the U.S. population is African American, American Indian, or Hispanic, yet ...



of Ph.D. recipients in science, technology, engineering, and math belong to those minority groups.

Source: Northwestern University and Icahn School of Medicine at Mount Sinai.

COLLEGIAL LIFE

candidates,” adds Dr. Akabas, who is also a professor in the Dominick P. Purpura Department of Neuroscience.

MATCHED TO LABS

Einstein receives 140 applications each year for just seven PREP positions. After the scholars are chosen, Dr. Akabas and his co-director, Victoria Freedman, Ph.D., associate dean for graduate programs in biomedical sciences, determine the students’ research preferences and match them with faculty members with similar interests. The “PREPpies” talk with potential mentors, make their choices, and then jump right into their lab work.

Most scholars spend one year in PREP, although some stay for two if they need more research time or choose to take classes they missed while they were undergraduates. For example, current PREP scholar Leandrew Dailey, 22, from Piñon, Arizona, is taking biochemistry while working on research to develop antibodies to fight viruses, including Ebola, in the lab of his mentor, Jonathan R. Lai, Ph.D., professor of biochemistry.

“The PREP program has definitely helped me decide what type of research I want to focus on,” says Mr. Dailey, who grew up on a Navajo Nation reservation and earned his bachelor’s degree at Fort Lewis College in Durango, Colorado. “And it has made me confident in my ability to pursue a scientific career.”

Drs. Akabas and Freedman also meet regularly with the scholars to help them prepare for the graduate school application process, choose which (and how many) schools to apply to, write the all-important personal statements included in graduate school applications, and practice for interviews.

“The statement helps a graduate

school admissions committee to know your goals, what you’ll bring to the school, and what you’re hoping to get out of their program,” says Marcel Malena, 23, a PREP scholar from Queens. He is working with his mentor, Libusha Kelly, Ph.D., assistant professor of systems & computational biology, to study metabolism and the microbiome of the human gut.

“It’s a good chance to highlight significant things about yourself that don’t appear elsewhere on your application,” Mr. Malena says. He adds, “While it’s great to get help with our research and getting into graduate school, Dr. Akabas and Dr. Freedman also help us with personal issues, because they know training for our future is more complicated than just science and data.”

The grad students and postdocs in the Einstein Minority Scientist Association work with the PREP scholars as well. “Among other benefits, this kind of close peer mentoring provides our PREP scholars with role models, showing that other minorities are

“The PREP program has definitely helped me decide what type of research I want to focus on. And it has made me confident in my ability to pursue a scientific career.”

— LEANDREW DAILEY
PREP SCHOLAR



LEANDREW DAILEY
Current PREP scholar,
with mentor Dr. Jonathan Lai



MARCEL MALENA
Current PREP scholar

“Dr. Akabas and Dr. Freedman also help us with personal issues, because they know training for our future is more complicated than just science and data.”

— MARCEL MALENA,
PREP SCHOLAR

succeeding in this field, so they know they can, too,” Dr. Freedman says.

Attending an annual symposium with the PREP programs from two other medical schools—the Icahn School of Medicine at Mount Sinai in New York City and the University of Pennsylvania in Philadelphia—gives the scholars the chance to present their research. They also go to the NIH-sponsored Annual Biomedical Research Conference for Minority Students, the largest meeting of its kind in the United States. There they take professional-development workshops, attend scientific sessions, and network with graduate school deans.

A HIGH SUCCESS RATE

All 21 candidates who’ve completed Einstein’s PREP program have been accepted to grad school. Ms. Dorizan, for example, is now in her fourth year in the interdepartmental neuroscience graduate program at Northwestern University in Chicago. “Pursuing my PREP research project, presenting my

WHY DIVERSITY MATTERS

Einstein offers several “pipeline” initiatives aimed at increasing diversity and promoting inclusion in the medical and science workforce. But the Postbaccalaureate Research Education Program (PREP) is the only one that focuses on bridging the gap between undergraduate and graduate programs in the biomedical sciences.

PREP and the other programs are important for addressing long-standing inequalities, “but they also lead to better science,” says Victoria Freedman, Ph.D., Einstein’s co-director of the PREP program.

Libusha Kelly, Ph.D., assistant professor of systems & computational biology and a mentor to one of this year’s PREP students, agrees. “Science needs a diversity of viewpoints to keep making groundbreaking discoveries,” she says. “If you only support people coming out of the same schools, the same labs, you’ll never get the kind of creativity that comes from interactions between people with different backgrounds, different training, different ideas. We need to do this at all levels.”

research at conferences, learning how to ask questions at seminars, and talking about my work with other scientists gave me the preparation I needed to set myself up for success in graduate school,” says the 27-year-old.

“Graduate schools aren’t looking for students who have memorized information—they want students who are excited about science and know how to tackle a research project, and that’s what I got from Einstein,” she adds. “I’m in an amazing neuroscience program, and I would not be here without PREP.” **E**

COLLEGIAL LIFE





HOW TO BE A TEACHING STAR

An innovative educational training program is improving the quality of instruction for Einstein students

BY TERESA CARR

The teenager had a deep gash in his forehead, and James Yuan, M.D., was a medical student on rotation in the emergency room at Children's Hospital at Montefiore (CHAM). A resident, William Sokoloff, M.D., pulled in Dr. Yuan to help treat the young man, and the experience is something Dr. Yuan says he'll never forget. "Will walked me through the process of suturing, explaining what he was doing and why. All the while, he was still reassuring the patient," says Dr. Yuan, now a pediatric resident at CHAM. "I felt involved even though I was mostly watching. It was really cool."

Dr. Sokoloff, now a pediatric chief resident in hospital medicine at CHAM, says that the feedback he has received from people like Dr. Yuan through Einstein's Teaching Star Program has been invaluable in helping him become a better instructor. One of the main things he has discovered, he says, is that "the

lessons that stick with students, those that they learn the most from, are interactive and are with or about a patient."

Now that Dr. Yuan is responsible for teaching medical students himself, he tries to emulate Dr. Sokoloff's approach. "While on the wards, medical students struggle with whether they are just going to be a fly on the wall or more actively involved with the patients," he says. "I try to put myself back in their shoes and keep them engaged and interested."

Dr. Sokoloff adds: "Part of what you are supposed to learn through your medical training is how to teach medicine to other people. Teaching is an art and science unto itself, but most doctors don't receive much guidance—much less formal training—on the topic."

A NATIONAL MODEL

Einstein's Teaching Star program was originally developed five years ago to provide nonfaculty instructors with clear learning objectives for the courses and clerkships in which they taught, says Joshua Nosanchuk, M.D., senior associate dean for medical education at Einstein. Under the leadership of Pablo

Joo, M.D., associate dean for medical education and curricular affairs, it has become a national model, earning commendations from the Middle States Commission on Higher Education and from the Liaison Committee on Medical Education, the body that accredits medical schools.

This year, about 2,000 people received training through Teaching Star. "It has been a massive endeavor," Dr. Joo says. "But it's the right thing to do—for everyone involved."

TEACHING GUIDANCE

Teaching Star also provides resources to help people become more effective teachers. For example, it's a teacher's job to point out students' mistakes, but sharp criticism can cause students to pull back from learning situations. The training covers practical tips for giving constructive feedback and setting up a positive learning environment—reinforcing what students do right, correcting mistakes without being judgmental, and helping students plan the next steps.

"I wish something like this had been around when I was going through my

Dr. William Sokoloff tends to a young patient at Children's Hospital at Montefiore as third-year medical student April Dobkin looks on.

COLLEGIAL LIFE



Under Dr. Pablo Joo, it has become a national model. This year, about 2,000 people received Teaching Star training. “It has been a massive endeavor. But it’s the right thing to do.”

medical education,” says Amanda Raff, M.D., associate chair of medicine for undergraduate medical education at Einstein and Montefiore. “I would have enjoyed more explicit guidance and direction on ways you can teach.”

In medicine, Dr. Raff notes, “there’s a long history of ‘see one, do one, teach one,’ with the expectation that we all know how to teach. But most of us can get better with some education about teaching skills. We can give these young teachers some tools so that they can do their best.”

In addition to faculty and residents, many other professionals, including

graduate students, postdoctoral researchers, clinical fellows, nurses, and social workers, teach students. That diversity of skills and experience creates a rich learning environment, Dr. Joo says. But it can be a challenge to bring everyone up to speed.

“Medicine is a dynamic field,” says Ruth Howe, an M.D./Ph.D. student who teaches histology to first-year medical students. She has been known to belt out “Bone! What Is It Good For?” to the tune of Edwin Starr’s “War” during class while dancing the electric slide, and her engaging style earned her a Teaching Star commendation last year. “You have to be aware of learning styles and figure out how to modify your teaching accordingly,” she says. “Teaching Star helped me become more conscious of that.”

CONTINUOUS IMPROVEMENT

Teachers also need feedback to get better at their jobs, so the Teaching Star program uses surveys that students submit anonymously to evaluate teachers’ effectiveness. The office of medical education reviews each individual comment in order to identify issues that may otherwise get lost in the aggregated information.

All instructors receive teaching evaluation reports based on those surveys and can see how their performance stacks up against benchmarks for teaching behaviors, from subpar to excellent. Those with low scores are flagged for teaching improvement.

“We approach each situation from the position that we all want to provide the best possible educational experience for our students—and that this is an opportunity for growth for instructors,” Dr. Joo says. “Those who need some additional guidance or support meet

HOW IT WORKS



Teaching Star training offers practical tips for setting up a positive learning environment.



All instructors get teaching evaluations based on student surveys and can see how their performance stacks up.



Those with high marks from their students receive commendations as “Teaching Stars.” Those with low scores are flagged for teaching improvement.

Ruth Howe, an M.D./Ph.D. student, uses a model of the spinal column to instruct first-year medical students Janet Conde, center, and Obioesio Bassey.

with their course or clerkship director, and the two of them determine the best way to enhance their performance.”

Those with high marks from their students receive commendations as “Teaching Stars.” According to Dr. Joo, the recognition for teaching excellence has motivated residents to take that aspect of their job seriously and strive for the honor. It is also a nice award to include on their resumes.

The evaluation reports are “a fantastic part of the program,” says Catherine C. Skae, M.D., associate dean for graduate medical education at Einstein. “Otherwise I would have no idea who the good teachers are and who puts extra effort into teaching,” she adds.

Dr. Skae says she particularly enjoys the opportunity to praise people who are doing a great job. “When residents and fellows, who are extremely busy all the time, are taking the time to devote themselves to medical student teaching, it’s wonderful to salute that,” she says.

Dr. Sokoloff, a Teaching Star award recipient, says he relies on the feedback from evaluations to “learn how to reach people in different ways.” He has discovered, for example, that a short lecture during rounds might help some students, while others need to read more about the subject or see a diagram.

“You are required to teach someone concepts and skills in the moment, often with patients right in front of you,” he says. “If you’re going to get better at it, you need someone to tell you if you are doing it wrong or right.” He adds, “I



didn’t realize what went into teaching until it became so much of my job.”

Dr. Sokoloff’s experience is not unique. Data collected from student surveys suggest that the Teaching Star program has helped improve the overall quality of teaching at Einstein and its affiliates. “Over the years, we’ve seen the number of commendations increase, while flags have decreased,” Dr. Joo says. Few people get flagged more than once, which indicates that the personalized guidance on teaching skills is successful.

LIFELONG SKILLS

The next step for Teaching Star, Dr. Joo says, is to expand the program to encompass and train medical students as peer educators. That’s in line with the program’s larger mission, which, he says, is to “help people think about their roles in medical education.” In today’s interactive environment, students learn from their peers as well as from their instructors. And as they progress through their medical training, they will take on increasing responsibility for instructing students in classes that follow theirs.

“You are required to teach someone concepts and skills in the moment, often with patients right in front of you.”

— DR. WILLIAM SOKOLOFF

Expanding the program is a great idea, Ms. Howe says. Teaching skills have been “a bit of a neglected part of clinical training,” she says. “Nothing makes you learn the material as well as teaching it does. I see it as a career skill, something that I’ll use for the rest of my life.”

Dr. Sokoloff says that the time he invests in teaching is helping make him a better physician. “If you are not able to do a good job teaching concepts to your peers,” he says, “then you are definitely not going to be able to talk to your patients and their families in a way that they can understand.” **E**

Addiction Specialist to Advise CDC on Opioids



Chinazo Cunningham, M.D., M.S., professor and associate chief of general internal medicine at Einstein and Montefiore and an expert in opioid-use disorder, has been selected to serve on a board advising the U.S. Centers for Disease Control and Prevention (CDC) about the nation's opioid epidemic.

Dr. Cunningham has led multiple clinical studies funded by the National Institutes of Health, the CDC, and the New York State Department of Health, among others, to investigate treatments for substance-use disorders and develop new protocols for existing medications, particularly buprenorphine, a highly effective drug used to treat opioid addiction. She is currently leading the first long-term federally funded study to test whether medical marijuana reduces opioid use among adults with chronic pain.

She will be one of 18 members of the CDC's Board of Scientific Counselors of the National Center for Injury Prevention and Control (NCIPC). The NCIPC deals with unintended overdoses as part of its oversight of injury- and violence-prevention research. During her four-year board appointment, which began in September, Dr. Cunningham will serve on at least two working groups convened by the CDC, including one addressing opioid prescriptions.

Dr. Cunningham served on the New York City Mayor's Heroin and Prescription Opioid Public Awareness Task Force and was previously a member of the CDC's Opioid Guideline Workgroup. She also was recently appointed by New York's governor to a working group charged with drafting legislation for regulated adult-use marijuana, including medical marijuana.

Dr. Susan Band Horwitz Wins 'Canada's Nobel'



In April **Susan Band Horwitz, Ph.D.**, distinguished professor and former co-chair of molecular pharmacology and the Rose C. Falkenstein Chair in Cancer Research, received the 2019 Canada Gairdner International Award. Nicknamed "Canada's Nobel," the annual prize recognizes outstanding biomedical scientists who have made original contributions to medicine.

Groundbreaking research by Dr. Horwitz on the mechanism of action of the chemotherapy drug Taxol paved the way for it to become a blockbuster medication that is used to treat ovarian, breast, and lung cancers. Dr. Horwitz has received numerous honors and awards, including the C. Chester Stock Award from Memorial Sloan Kettering Cancer Center, the Warren Alpert Foundation Prize from Harvard Medical School, The Bristol-Myers Squibb Award for Distinguished Achievement in Cancer Research, The American Cancer Society's Medal of Honor, and the American Association of Cancer Research's (AACR) Lifetime Achievement Award. She has served as president of the AACR and is a member of the National Academy of Sciences and many other organizations and societies.



Einstein Achieves Independent Degree-Granting Authority

More than six decades after it first opened its doors, Einstein is now an independent academic institution, with the authority to confer its own medical and graduate degrees. This achievement, announced in March, had been set in motion more than three years ago, when Yeshiva University entered into a strategic joint collaboration with its longtime Einstein affiliate, Montefiore.

“This is a truly momentous event in Einstein’s history,” states Gordon F. Tomaselli, M.D., the Marilyn and Stanley M. Katz Dean at Einstein and executive vice president and chief academic officer at Montefiore Medicine. “It gives us the best of all worlds—allowing Einstein to further partner with our longtime clinical and research partner, Montefiore, tapping into a health system that is a national model for innovation, and elevating Einstein’s ability to conduct impactful research and train the next generation of outstanding physicians and scientists, while maintaining our long-standing and

deep affiliation with our academic partner, Yeshiva University.”

“Einstein is entering a new era,” says Steven M. Safyer, M.D., CEO of Montefiore Health System and Albert Einstein College of Medicine and a graduate of Einstein. “Our commitment to innovation and excellence, providing healthcare where and when people need it most, is a key component to establishing Montefiore as a leading integrated health system. This announcement also paves the way for Einstein and Montefiore to build upon and expand their joint efforts, while pursuing novel approaches to science and medicine that benefit humanity.”

Dr. Ari Berman, president of Yeshiva University, expresses enthusiasm about the transition. “Einstein continues to be an important affiliate of Yeshiva University and a shining example of our commitment to preparing students with the knowledge and tools to have a meaningful and positive impact on the world.”

Dr. Margaret Kielian Awarded the 2019 Horwitz Prize

On March 11, **Margaret Kielian, Ph.D.**, was awarded the 13th Annual Marshall S. Horwitz, M.D., Faculty Prize for Research Excellence. The prize was established in memory of Marshall S. Horwitz, M.D., to honor his contributions to research and medical education at Einstein. Dr. Kielian, who is a professor of cell biology and holds the Samuel H. Golding Chair in Microbiology, presented her lecture, “How Viruses Infect a Cell: Structure, Function, and Inhibition of Virus Membrane Fusion Proteins.” Dr. Kielian studies viruses surrounded by lipid membranes containing viral proteins. They include the disease-causing, mosquito-borne alphaviruses such as Chikungunya and flaviviruses such as dengue, Zika, and West Nile. Dr. Kielian investigates how these enveloped viruses enter host cells, replicate, and then exit to infect other cells. Molecular studies of the entry and exit mechanisms required by these viruses can lead to targeted antiviral therapies.



Making Sense of Bladder Cancer

Mark Schoenberg, M.D.

Professor and chair of urology, Montefiore and Einstein; David Pulver; and Fran Pulver



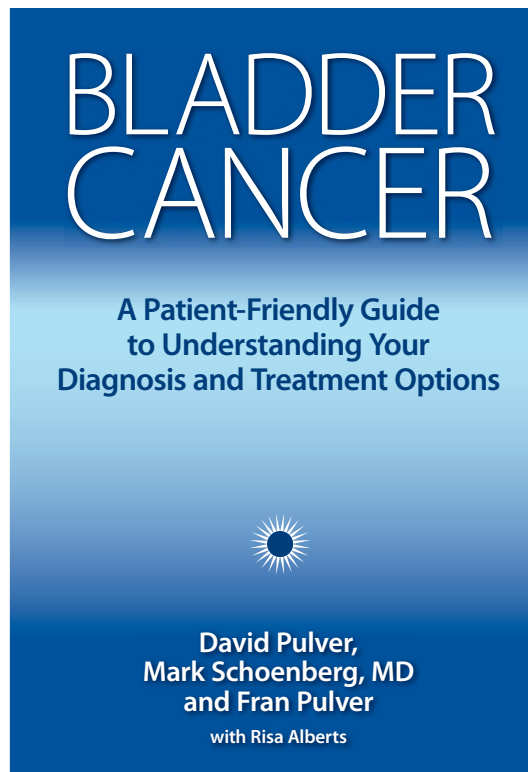
Bladder cancer is the country's fifth most common type of cancer, but it doesn't receive much publicity. It's four times more common in men than in women, is usually found in those over age 55, and affects cigarette smokers two to three times more often than

nonsmokers. Blood in the urine is the most common sign.

In *Bladder Cancer: A Patient-Friendly Guide to Understanding Your Diagnosis and Treatment Options*, Dr. Mark Schoenberg teams up with patient David Pulver, who came to him for a second opinion when he was diagnosed in 2007, and David's sister, Fran Pulver, a professional medical writer. The book aims to quell fears by educating patients about bladder cancer so they can understand their diagnoses and make more-informed decisions about treatment.

The book's key chapters take readers from diagnosis (What is the grade of the cancer? the stage? the cell type? the pathology report?) to tests (cystoscopy, urine, CT scans, MRIs, and more) to the three types of bladder cancer and treatment options for them. Seventy-five percent of patients have the most common and most survivable type, in which the tumor has not invaded surrounding muscle; 20 percent of patients have muscle-invasive bladder cancer; and about 5 percent have metastatic bladder cancer.

Other chapters explain how the urinary system works; they include detailed medical illustrations and offer patients advice about choosing a doctor, finding the best hospital, and asking about treatment options. The book offers a useful glossary of bladder cancer terms written in easy-to-understand language, tells patients how to find clinical trials for evaluating new



Patient-Friendly Publishing

bladder-cancer treatments, and provides resources for patient-advocacy organizations, support groups, cancer-survivorship groups, and health and medical information databases.

With proper medical management, most cases of bladder cancer are highly treatable. This book can help patients take better control of their care and boost their chances for successful outcomes.

PUBLISHED BY: [Patient-Friendly Publishing, 2017](#)
(all profits donated to cancer research)

Excerpt from Chapter 2:

Understanding the "Language" of Bladder Cancer

As you start learning about bladder cancer, you will quickly realize that you need to learn new words, such as cystoscopy, TURBT, cytology, stage, grade, intravesical drug therapy, radical cystectomy, progression, and urothelium. Becoming familiar with relevant medical terms is an important step in demystifying your disease and educating yourself so you can play an active role in decisions impacting your treatment and care.

A Helpful Tool for Battling the Blues

Simon A. Rego, Psy.D.

Chief psychologist, director of psychology training, and director of cognitive behavioral training at Montefiore, and associate professor of psychiatry and behavioral sciences at Einstein, and Sarah Fader

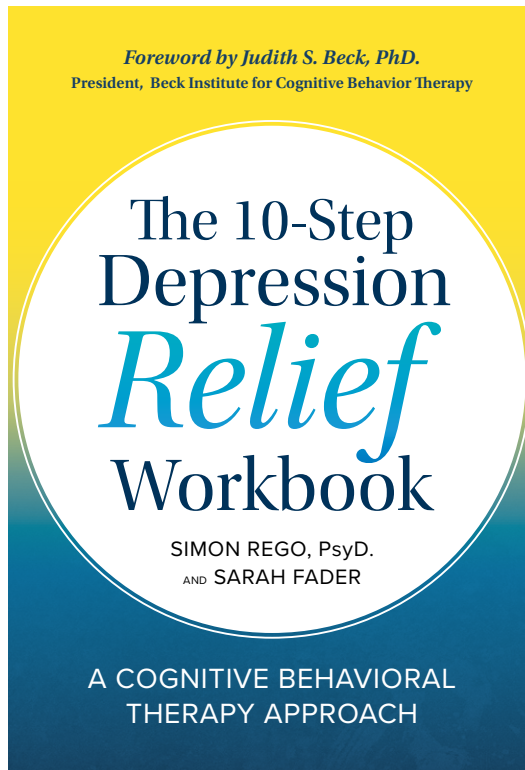


About one in six U.S. adults will experience depression at some point in their lives, but many don't do anything about it. Barriers to getting help include social stigma, the expense of drugs and therapy, and a lack of trained healthcare providers.

One of the most intensively studied treatments for depression is cognitive behavioral therapy (CBT), aimed at helping patients change firmly established but self-defeating patterns. CBT can help patients learn to rationally evaluate their thoughts while they gradually increase activities that provide pleasure or accomplishment. It can also help them decrease activities that may contribute to depression, such as poor eating and sleeping habits, isolating themselves, not exercising, or abusing drugs or alcohol. Such changes help patients cope with challenges that might otherwise seem overwhelming. CBT can be as effective as antidepressant medication, according to a large-scale 2016 analysis by the federal Agency for Healthcare Research and Quality.

For those dealing with mild-to-moderate depression on their own or who want to improve their existing therapy, *The 10-Step Depression Relief Workbook* could be a useful resource.

Dr. Rego, a board-certified cognitive behavioral psychologist with more than 20 years of experience, and Sarah Fader, CEO and founder of the nonprofit Stigma Fighters group, begin the book with a screening questionnaire that readers can use to assess the severity of their depression. Subsequent chapters contain helpful exercises and homework. Throughout the book, readers are encouraged to identify problem areas or themes that often arise when people are depressed.



Tools offered in the book include worksheets that help readers assess whether their thoughts or concerns are reasonable or not; a list of questions to help set realistic, achievable goals; and exercises for identifying and coping with negative thinking. All of these tools can help readers overcome challenges and get through depressive episodes. The book also offers advice on better managing tasks to get things done, changing behavior patterns, and facing fears.

The 10-Step Depression Relief Workbook concludes by emphasizing the need for healthy lifestyle habits (including a sample exercise routine) and by urging readers to practice gratitude and maintain mindfulness. Changing negative thought patterns is challenging but possible. Dr. Rego's book offers valuable tools for guiding readers through dark times.

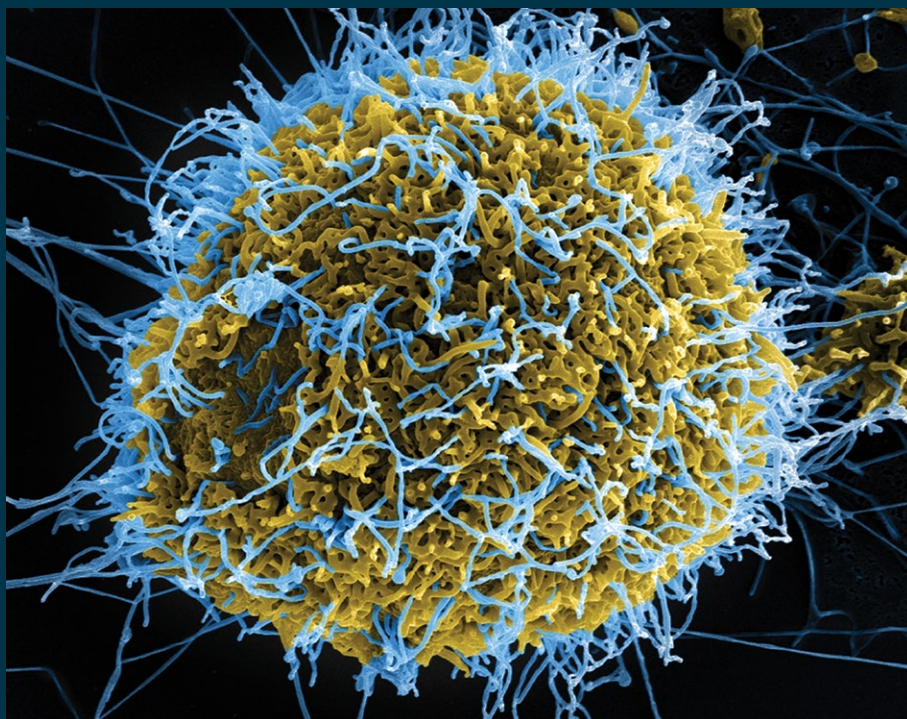
PUBLISHED BY: [Althea Press](#), 2018

Excerpt from Step 3:

Identify Your Problem Areas

Thought records are a key CBT tool for distinguishing between thoughts and feelings. ... [T]hought records teach us in a structured way that we do not have to believe everything we think, especially when our feelings are negative. E

RESEARCH NOTES



Ebolaviruses (in blue) emerging from an infected cell.

Einstein Researchers Contribute to Promising Ebola Treatment

When it comes to ebolavirus, it's a matter not of whether it will strike again but rather of when and where. The current ebolavirus outbreak in central Africa's Democratic Republic of the Congo (DRC) ranks as the second-largest and second-deadliest in history: more than 1,250 cases and over 800 deaths as of April 2019, according to the World Health Organization. Children—who are much more likely to die from Ebola infection than are adults—now account for nearly one-third of all cases.

This is the 10th DRC outbreak since 1976, when the ebolavirus was first reported near the Ebola River, and the second this year. The deadliest was

the 2013–16 western Africa outbreak, which killed more than 11,000 people.

Two companion papers published online on Jan. 9 in *Cell Host & Microbe* show that a new human antibody cocktail works against all three major disease-causing ebolaviruses.

“Most antibody therapies target just one specific ebolavirus,” says Einstein's Kartik Chandran, Ph.D., lead author of the first paper. He is a professor of microbiology & immunology and the Harold and Muriel Block Faculty Scholar in Virology at Einstein.

The most-advanced therapy—ZMapp™, a cocktail of three monoclonal antibodies—is specific for Ebola virus (formerly known as “Ebola

Zaire”), which is causing the current DRC outbreak. But ZMapp and the other antibody therapies being tested in the DRC don't work against two related ebolaviruses (Sudan virus and Bundibugyo virus) that also have caused major outbreaks.

“Our antibody cocktail fills the need for a ‘pan-ebolavirus’ drug that would help people infected in any Ebola outbreak, regardless of the virus causing it,” Dr. Chandran says. “It's the first treatment that could offer broad protection against all three major disease-causing ebolaviruses.”

In the first study, Dr. Chandran led the team that developed MBP134, a cocktail of two monoclonal antibodies (mAbs)—one isolated from a human Ebola survivor, the other from the same survivor but further engineered to recognize and neutralize Sudan virus. MBP134 inhibited infection by all three ebolaviruses in guinea pigs. An improved version called MBP134AF harnessed the power of natural killer immune cells and proved more effective than any previous anti-Ebola mAbs.

In the second study, a team that included Dr. Chandran tested the MBP134AF cocktail in ferrets and macaques infected with the three ebolaviruses. The cocktail was protective against all three pathogens, and just a single dose was able to inhibit viral infection and reverse disease in the macaques. The development of MBP134AF could be a model for quickly engineering new drugs against emerging pathogens.

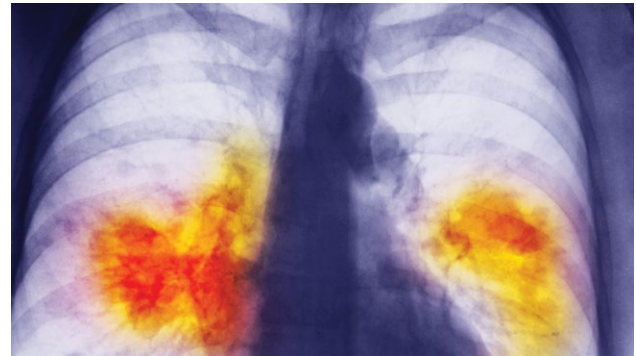
Immunotherapy Combats Metastatic Lung Cancer

When lung cancer has spread to other parts of the body, standard chemotherapy offers only a modest survival benefit. In a major advance described in September 2018 in *The New England Journal of Medicine*, an international team, including researchers from Albert Einstein College of Medicine and Montefiore Health System, reported that combining chemotherapy with the immunotherapy drug Keytruda extends the lives of people with metastatic squamous non-small cell lung cancer (NSCLC) by more than 40 percent compared with chemotherapy alone. This significant improvement should immediately change the standard of care.

“Immunotherapy is revolutionizing cancer care, and this study is further

evidence of its power,” said Balazs Halmos, M.D., M.S., coauthor of the paper and director of the multidisciplinary thoracic oncology program at the Montefiore Einstein Center for Cancer Care and director of clinical cancer genetics at the Albert Einstein Cancer Center.

NSCLC is the most common type of lung cancer, accounting for 85 percent of all cases. There are two main types: squamous and non-squamous NSCLC. This double-blind, randomized controlled trial enrolled 559 patients with metastatic squamous NSCLC. Approximately half the patients were treated with standard



chemotherapy involving two chemotherapy drugs plus placebo (the control group); the other half received two chemotherapy drugs plus Keytruda.

Compared with chemotherapy alone, adding Keytruda to chemotherapy improved patients’ median overall survival by 4.6 months (15.9 months vs. 11.3 months, or a 40.7 percent improvement) and extended by 1.6 months the time during which the disease did not progress (6.4 months vs. 4.8 months, or a 33 percent extension).

Novel Combination Therapy Speeds Wound Healing

Adding a gene-suppressing drug to an over-the-counter gel cut wound-healing time by half and significantly improved healing outcomes compared with control treatments.

Results from the combination therapy, which was tested in mice, were published in October in *Advances in Wound Care*. “Not only did wound healing occur more rapidly and completely, but actual regeneration occurred, with hair follicles and the skin’s supportive collagen network restored in wounded skin—clinically important improvements that are unprecedented in wound care,” says senior author David J. Sharp, Ph.D.,

professor of physiology & biophysics at Einstein. “We foresee this therapy having broad application for all sorts of wounds, from playground cuts to battlefield injuries to chronic wounds.”

In 2015 Dr. Sharp’s lab discovered that the enzyme fidgetin-like 2 (FL2) puts the brakes on skin cells as they migrate toward wounds to heal them. He reasoned that reducing FL2 levels might enable healing cells to reach their destination faster. So his team developed small interfering RNA molecules (siRNAs) that specifically inhibit the gene that codes for FL2. When the siRNAs were encased in nanoparticles

and sprayed on mouse skin wounds, the treated wounds healed faster than untreated wounds.

In this study, Dr. Sharp enhanced the siRNAs’ wound-healing potential by combining them with PluroGel—a protective antimicrobial gel that keeps wounds moist when applied to bandages. Dr. Sharp incorporated the siRNAs into microparticles made of collagen, a protein that releases its siRNA “cargo” after coming in contact with the skin.

Dr. Sharp plans to seek U.S. Food and Drug Administration permission to test the wound-healing therapy in clinical trials.

Preventing Harmful Cell Death

Apoptosis, also known as programmed cell death, is a normal physiological process that enables unhealthy or excess cells to self-destruct. However, unwanted and uncontrolled apoptosis can be harmful—contributing to the death of heart-muscle tissue following heart attacks and to the cell loss that occurs in stroke and in Alzheimer’s and Parkinson’s disease.

In a study published in February in *Nature Chemical Biology*, researchers led by Evripidis Gavathiotis, Ph.D., associate professor of biochemistry and of medicine, describe several small molecules that bind to and inhibit BAX, the protein that plays a key role in causing apoptosis. The researchers also identified a previously unrecognized pocket within the BAX protein to which these novel inhibitors bind, stabilizing BAX and preventing it from triggering apoptosis. In vitro experiments performed by Dr. Gavathiotis and colleagues showed that the inhibitors protected mouse fibroblasts from apoptotic stimulation.

“The BAX protein has the last word when it comes to life-and-death decisions in cells,” Dr. Gavathiotis says. “BAX ‘executes’ cells by attaching to their mitochondria and creating holes in mitochondrial membranes that commit the cells to apoptosis and drain cells of their energy supply. We’re hopeful that our BAX inhibitors have potential use as drugs for preventing cell death during heart attacks and other conditions in which minimizing cell loss is essential.”



Depression Linked to Poor Diabetes Self-Management

Depression is more common among people with type 2 diabetes (T2D) than in those without the condition and is also associated with a greater risk for serious complications, possibly because depressed individuals with T2D tend to neglect their medication regimen. In a paper published last December in the *Journal of Diabetes and Its Complications*, Einstein researchers led by Jeffrey Gonzalez, Ph.D., associate professor of medicine and of epidemiology & population health, explored the connection between depression and medication adherence among 376 low-income, racially diverse adults with poorly controlled T2D. All participants filled out questionnaires to assess symptoms of depression.

The 83 people (22 percent of the group) who tested positive for major depressive disorder had a nearly threefold increased risk for low medication adherence compared with nondepressed participants. Somewhat surprisingly, adherence was also a problem for individuals who reported feeling fatigued but were not depressed: They were 77 percent more likely than nonfatigued individuals to have low medication adherence.

“We observed a significant relationship between depression and medication nonadherence in our study,” Dr. Gonzalez says. “In addition, fatigue may have a connection to the risk for nonadherence that is independent of depression’s role. These results suggest that health providers should be alert to the presence and severity of depression as well as the presence of fatigue when trying to improve medication adherence among their patients with type 2 diabetes.”

Lab Chat

Keisuke Ito, M.D., Ph.D., studies the metabolic requirements of hematopoietic (blood-forming) stem cells (HSCs). In 2012 Dr. Ito was recruited to Einstein from Harvard Medical School, where he was an instructor in medicine. He is now an associate professor of cell biology and of medicine and the director of scientific resources at the Ruth L. and David S. Gottesman Institute for Stem Cell and Regenerative Medicine Research at Einstein.

What is your research focus?

HSCs can either produce new HSCs or differentiate into all the body's blood cells. I'm interested in finding the cellular mechanisms that maintain equilibrium between HSC self-renewal and differentiation—and that lead to blood cancers when defects occur. For example, we've found that inhibiting fatty-acid oxidation in HSCs causes them to lose the capacity to self-renew and instead to undergo differentiation. When we looked for the downstream effect of fatty-acid oxidation, we found that it induces mitophagy—the selective degradation of old or defective mitochondria.

What are the clinical implications?

We're exploring ways of suppressing mitophagy in HSCs, which—by halting HSC self-renewal—could help in treating or even preventing blood cancers. On the other hand, strategies that encourage mitophagy could be useful for expanding the number of HSCs available for stem-cell transplants. So being able to direct the fate of HSCs could have major health benefits.

Could you talk about your background?

I was born in Tokyo and grew up in Kanagawa Prefecture, just south of Tokyo. I attended school in Tokyo, earning my M.D. and Ph.D. degrees from Keio

University. I came to the United States in 2006 to be a postdoctoral fellow at Memorial Sloan Kettering Cancer Center.

What do you like about working at Einstein?

Einstein has offered me an extremely supportive environment and wonderful collaborators. It has been great working with Meelad Dawlaty, Ulrich Steidl, Rajat Singh, and their colleagues in genetics, hematology, and cellular metabolism, as well as with Paul Frenette and his stem-cell group.

What do you do in your spare time?

A friend has a boat that we sail from City Island to Long Island in the summer. I also swim year-round in an indoor pool.

Anything else?

In the summer, my wife and I enjoy going to Tanglewood to hear the Boston Symphony Orchestra. We've gone there several times to listen to *Dvorák's Symphony No. 9* (the *New World Symphony*). We also love going to the Metropolitan Opera, particularly for Italian operas—*Turandot*, *Aida*, *La Traviata*.

What other music do you especially like?

It depends. Listening to Edward Elgar's



Pomp and Circumstance Marches motivates me to work more energetically. But when I'm trying to concentrate, I really like the English composer Gustav Holst's orchestral suite *The Planets*, the "Jupiter" movement in particular.

Do you do much reading outside of the scientific literature?

I like to read books about Japanese history. I especially like reading about the era of the provincial wars. It started about 550 years ago and lasted more than 100 years, with almost constant military conflict.

Is there something that people might be surprised to know about you?

I'm not a very big guy but I loved playing rugby—in junior high school and medical school. I'm still in touch with several of my former teammates and still really like watching the sport.

3 Major Grants to Fight Colorectal Cancer



Dr. Augenlicht has hypothesized that feeding mice a Western-style diet can turn certain stem cells into cancer stem cells.

Colorectal cancer ranks second only to lung cancer as the leading cause of cancer-related death among men and women in the United States. Some people inherit a genetic susceptibility, but for well over 80 percent of people who develop the disease, diet strongly influences whether colorectal cancer will occur and whether it will progress.

The National Institutes of Health has awarded Leonard Augenlicht, Ph.D., professor of medicine and of cell biology and director of the Albert Einstein Cancer Center's Biology of Colon Cancer Program, three new grants totaling \$7.1 million to further study how diet influences colon cancer.

Researchers know that intestinal stem cells—vital for maintaining intestinal tissue—can undergo malignant transformations leading to colon cancer. In previous studies, Dr. Augenlicht showed that feeding mice a high-fat, low-fiber, Western-style diet profoundly

alters the differentiation of intestinal stem cells and their energy metabolism. He has hypothesized that these and other diet-induced changes can turn certain stem cells into cancer stem cells.

With two five-year grants of \$2.5 million and \$1.5 million, Dr. Augenlicht will study how feeding mice the higher-risk, Western-style diet influences the function of different kinds of intestinal stem cells. This research may identify markers for detecting elevated cancer risk and the underlying mechanisms that lead to tumor development.

The third grant, for \$3.1 million over five years, will allow co-principal investigators Dr. Augenlicht and Winfried Edelmann, Ph.D., and co-investigator Matthew Gamble, Ph.D., to study colorectal cancer associated with Lynch syndrome (also called hereditary nonpolyposis colorectal cancer). Dr. Edelmann is a professor of cell biology and of genetics and the Joseph and Gertrud Buchler Chair in Transgenic

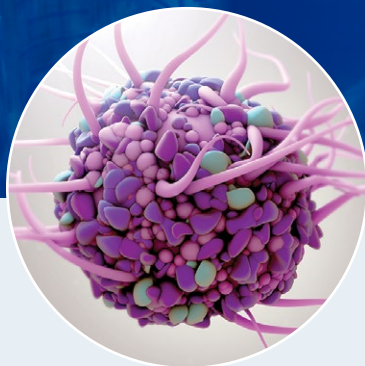
Medicine, and Dr. Gamble is an associate professor of molecular pharmacology and of cell biology.

Lynch syndrome occurs because people inherit mutations in one of their two copies of *MSH2* or other genes in the mismatched-DNA repair pathway—a key pathway for fixing DNA replication errors. People with Lynch syndrome (about 150,000 Americans) have up to an 80 percent risk of developing colorectal cancer during their lifetimes.

Dr. Edelmann has developed a new mouse model of Lynch syndrome that mimics the genetic and dietary influences of the human disease. Drs. Edelmann and Augenlicht found that feeding the animals a Western-style, higher-risk diet strongly promotes tumor development in the colon, just as it does in humans.

With the new grant, Drs. Augenlicht, Edelmann, and Gamble will study genetic and dietary interactions in this Lynch syndrome mouse model. These findings could lead to advances in detecting, preventing, and treating Lynch syndrome in particular and colorectal cancer in general.

MAJOR NIH RESEARCH AWARDS



Einstein and Montefiore faculty members were awarded \$172 million in funding from the National Institutes of Health in federal fiscal year 2018

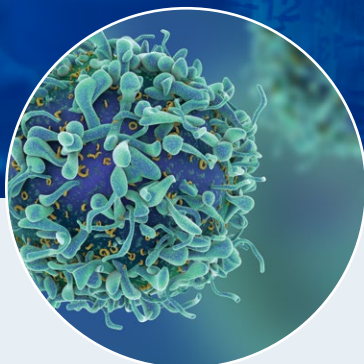
Uncovering Autoimmune Triggers

Dendritic cells and their MHC II proteins influence the body's immune response. MHC II proteins bind peptides that dendritic cells present to T cells. Depending on whether dendritic cells present "non-self" or "self" peptides, T cells will attack disease-causing microbes or cancer cells—or cause autoimmune disease by attacking the body's own tissues. Dendritic cells present different peptides based on where the cells are located and whether resting or inflammatory conditions prevail. The National Institute of Allergy and Infectious Diseases has awarded Laura Santambrogio, M.D., Ph.D., a five-year, \$4.1 million grant to determine how dendritic cells behave. She will study how MHC II-presented peptides maintain immunologic tolerance or instead lead to autoimmune diseases such as type 1 diabetes. Dr. Santambrogio is a professor of pathology and of microbiology & immunology at Einstein.

Immune Evasion in Tuberculosis

The TB bacterium *Mycobacterium tuberculosis* is notorious for evading the body's immune response. John Chan, M.D., Steven Porcelli, M.D., and Michael Berney, Ph.D., have found evidence that *M. tuberculosis* evades antituberculosis immunity by activating an immunosuppressive pathway controlled by the host enzyme indoleamine 2,3-dioxygenase (IDO). The NIH has awarded them a five-year, \$4 million grant to study how immunosuppression mediated by IDO activation helps *M. tuberculosis* stymie immune defenses in mice. The results could lead to better TB control measures. Dr. Chan is a professor of medicine and of microbiology & immunology at Einstein and is an attending physician in infectious diseases at Montefiore. Dr. Porcelli is a professor and the chair of microbiology & immunology, a professor of medicine, and the Murray and Evelyne Weinstock Chair in Microbiology & Immunology at Einstein. Dr. Berney is an assistant professor of microbiology & immunology at Einstein.

MAJOR NIH RESEARCH AWARDS



Major Study of Epigenetics in Aging

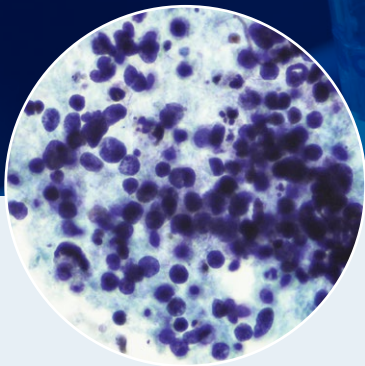
The National Institute on Aging has awarded John M. Greally, Ph.D., D. Med., a five-year, \$3.6 million grant to conduct the most comprehensive study to date of cellular epigenetic events in aging. DNA methylation—a DNA modification that alters gene expression—has consistently been found to change with age, but the mechanism responsible for this epigenetic change remains unknown. Dr. Greally will study T lymphocytes, which are implicated in age-related diseases. He will assess whether age-associated epigenetic changes to T lymphocytes result from events such as the reprogramming of cells or from other factors, including chronic exposure to stress hormones. The study will offer insights into how T lymphocytes are involved in age-related diseases. Dr. Greally is a professor of genetics, of medicine, and of pediatrics, and the director of the Center for Epigenomics at Einstein and clinical geneticist at Montefiore.

Insights Into How Cells Target and Damage Tissue

Autoimmune diseases occur when immune cells aberrantly attack the body's own cells or tissues. CD8 T cells strongly contribute to the pathology observed in type 1 diabetes and many other autoimmune diseases. Teresa DiLorenzo, Ph.D., and Steven Almo, Ph.D., have received a five-year, \$3.5 million grant from the NIH to fill in knowledge gaps regarding the protein-protein interactions that occur when CD8 T cells target and damage tissue. The research may lead to more-effective ways to manipulate and harness the immune system to prevent disease and improve health. Dr. DiLorenzo is a professor of microbiology & immunology and of medicine and the Diane Belfer, Cypres & Endelson Families Faculty Scholar in Diabetes Research at Einstein. Dr. Almo is a professor and the chair of biochemistry, a professor of physiology & biophysics, and the Wollowick Family Foundation Chair in Multiple Sclerosis and Immunology at Einstein.

Early Programming of Childhood Obesity

Studies show that children born underweight are at higher risk for obesity, cardiovascular disease, and type 2 diabetes. One cause of obesity may involve changes in the patterns of DNA methylation that influence gene expression. The Eunice Kennedy Shriver National Institute of Child Health & Human Development has awarded Maureen Charron, Ph.D., and Mamta Fuloria, M.B.B.S., a five-year, \$3.4 million grant to study DNA methylation of blood cells of intrauterine growth-restricted infants, who are at high risk for becoming obese. Drs. Charron and Fuloria will examine the children's blood at birth and at age 2 to determine how DNA methylation has affected their CD3+ T cells, immune cells that influence the development of obesity. Dr. Charron is a professor of biochemistry, of obstetrics & gynecology and women's health, and of medicine at Einstein. Dr. Fuloria is an associate professor of pediatrics at Einstein.



Diagnosing Lung Cancer Noninvasively

DNA mutations cause cancer and are signs that genome-sequence integrity has been lost. The National Institute of Environmental Health Sciences has awarded Jan Vijg, Ph.D., and Simon Spivack, M.D., M.P.H., a five-year, \$3.3 million grant to assess genome integrity in normal human cells. The researchers will use a sequencing-based assay they recently developed for detecting most if not all types of mutations using bulk DNA and single-cell-based approaches. The assay will measure the mutagenic effects of tobacco smoke on buccal (cheek) mucosal cells. The work could, for the first time, allow people's lung-cancer risk to be assessed noninvasively. Dr. Vijg is a professor and the chair of genetics and the Lola and Saul Kramer Chair in Molecular Genetics at Einstein. Dr. Spivack is a professor of medicine, of epidemiology & population health, and of genetics at Einstein, and the chief of pulmonary medicine at Einstein and Montefiore.



Gut Microbiota, Cardiovascular Risk, and HIV

People living with HIV face an increased risk of developing cardiovascular disease (CVD). Emerging evidence suggests that gut microbiota (GMB) may contribute to CVD risk. The National Heart, Lung, and Blood Institute has awarded Qibin Qi, Ph.D., a five-year, \$3.26 million grant to investigate the link between GMB and CVD in patients with HIV. The study focuses on how GMB contribute to inflammation and immune activation, which are closely involved with CVD development. The findings should advance our understanding of the disease mechanism that leads to HIV-related CVD and also reveal strategies for preventing and treating CVD in HIV-positive individuals. They may also have important public health implications, since it may be possible to reduce the risk of CVD in the general population by altering GMB. Dr. Qi is an associate professor of epidemiology & population health at Einstein.



HPV and Cervical Cancer in HIV-Positive Women

Women who are HIV-positive have a high risk of becoming infected with human papillomavirus (HPV) and later developing cervical cancer. A five-year, \$3.2 million National Cancer Institute grant will allow Howard Strickler, M.D., and Robert Burk, M.D., to use sophisticated gene-sequencing techniques to study whether the risk of cervical precancer in HIV-positive women is largely due to previously acquired sexually transmitted HPV that has become reactivated (common among immune-suppressed women with HIV) and whether the methylation of HPV DNA affects precancer risk. Dr. Strickler is a professor and the division head of epidemiology and the Harold and Muriel Block Chair in Epidemiology & Population Health at Einstein. Dr. Burk is a professor of pediatrics, of microbiology & immunology, of obstetrics & gynecology and women's health, and of epidemiology & population health at Einstein and an attending physician at Montefiore. **E**



Cynthia Vasquez gets a hug from her son, Daniel, as she prepares a meal with her mother, Wendy Acevedo.



LIVING WITH LUPUS

BY GARY GOLDENBERG

When everything hurts, Einstein and Montefiore scientists are helping patients find relief

Like some other first-time mothers, Cynthia Vasquez of the Bronx experienced problems before and after giving birth, at age 18, to her son Daniel. But Cynthia's struggles several years ago were especially severe. Six months into her pregnancy, she was afflicted with pain and stiffness in her wrists, knees, ankles, and almost every other joint in her body, and her condition grew progressively worse.

Weeks went by before doctors diagnosed her condition: systemic lupus erythematosus (SLE)—a chronic autoimmune disease that inflames and damages tissues and organs throughout the body. SLE is the most common form of lupus. The American College of Rheumatology estimates that SLE affects as many as 322,000 U.S. adults—a conservative estimate, according to the U.S. Centers for Disease Control and Prevention. There is no cure, and treatment can be challenging. Cynthia was prescribed powerful immunosuppressant drugs to relieve the inflammation, but she could barely move by then.

Shortly before giving birth, Cynthia was admitted to Montefiore's Weiler

Hospital, where Irene Blanco, M.D., took over her care. "Little by little we quieted her symptoms," says Dr. Blanco, associate professor of medicine at Einstein and director of the adult lupus clinic at Montefiore.

A DISEASE THAT AFFECTS YOUNG WOMEN

Ninety percent of lupus patients are women, most of whom develop the condition in their childbearing years, between ages 15 and 45. Lupus that begins during pregnancy tends to be particularly complicated and challenging to treat. The disease is two to three times more prevalent among women of color—particularly Hispanics, like

LIVING WITH LUPUS

Cynthia, and African Americans—than among Caucasian women. Minority women tend to develop lupus at a younger age, suffer more-severe complications, and have higher mortality rates than their white counterparts.

Symptoms of lupus include the severe pain and physical impairment that Cynthia experienced, as well as fatigue, hair loss, difficulty thinking, and skin rashes that can be disfiguring. Inflammation from lupus can ravage organs throughout the body, leading to complications involving the kidneys, skin, lungs, and heart.

As better treatment has reduced kidney-related lupus deaths, cardiovascular disease now ranks as the leading cause of early death in people with lupus. Studies show that SLE patients face a heart-attack risk up to 50 times greater than the risk for the general population.

NO STANDARD THERAPY

To manage their patients' condition, physicians must rely primarily on just three types of drugs: hydroxychloroquine and other antimalarial drugs that modulate the immune system and have other beneficial effects; anti-inflammatories (e.g., nonsteroidal anti-inflammatory drugs and corticosteroids); and broadly acting immune-system suppressants (e.g., methotrexate and cyclophosphamide). All classes of lupus drugs (particularly the latter two) can cause serious complications, especially when patients require high doses or need them for long periods.

Fortunately, rheumatologists such as Dr. Blanco have become expert at managing lupus patients with the drugs available to them. (In the past 60 years, only one new drug—belimumab [Benlysta], first marketed in 2011—has been approved for treating lupus.) Their

skilled treatment efforts have helped boost lupus patients' five-year survival rate after diagnosis from only 5 percent in the 1950s to 90 percent today. Had Cynthia been born a generation ago, she might not have survived.

The delivery of Cynthia's baby was uneventful, but her pain and stiffness came roaring back a few months later. "It hurt even to blink," Cynthia recalls.

Such flare-ups are a feature of lupus, which tends to wax and wane. As before, Dr. Blanco devised a cocktail of therapies to quell Cynthia's symptoms. "No two lupus patients are alike, and there's no standard therapy for treating the many manifestations of the disease," Dr. Blanco says. "Our decisions regarding which drugs to use are based on our own experience, a small number of case reports, and trial and error."

In 2018, Dr. Blanco received a two-year grant from the U.S. Department of Health and Human Services' Office of Minority Health to develop a program with the American College of Rheumatology that uses community health workers to recruit minority lupus patients for clinical trials. "Previous lupus trials have enrolled too few women of color, and it's critical that our trial participants reflect the demographics of our patients," she says.

PROMPT DIAGNOSIS ESSENTIAL

Early diagnosis of lupus allows doctors to intervene with powerful drugs to halt

"No two lupus patients are alike, and there's no standard therapy for treating the many manifestations of the disease."

— DR. IRENE BLANCO

ANXIETY
PAIN SKIN RASHES
INFLAMMATION



Dr. Irene Blanco examines her patient Cynthia Vasquez.

disease progression and prevent lupus' notorious inflammation from silently damaging vital organs. Cynthia's disease was diagnosed within a few weeks of symptom onset, but many young lupus patients aren't so lucky—mainly because their symptoms imitate those of many other diseases.

Einstein and Montefiore researchers recently reported on nearly 600 pediatric lupus patients who were enrolled in a North American registry before age 21. In a paper published in 2017 in *Arthritis Care & Research*, the researchers found that only two-thirds of the patients were referred to pediatric rheumatologists within three months of symptom onset,

and one of every 10 patients experienced referral delays lasting as long as a year.

Patients living in poverty and in areas without access to specialty care tended to have the longest delays, says lead author Tamar Rubinstein, M.D., assistant professor of pediatrics at Einstein and attending physician in pediatric rheumatology at Children's Hospital at Montefiore (CHAM). Dr. Rubinstein worries that treatment delays will only get worse, mainly because the pool of pediatric rheumatologists is shrinking. There are only 300 such specialists in the entire country, leaving large swaths of the nation underserved.

CHAM, with its three pediatric

rheumatologists and three pediatric rheumatology fellows, is a notable exception to this trend. It has a long history of caring for young lupus patients, reflecting the needs of its large Hispanic and African-American community.

The Lupus Nephritis Clinic opened at CHAM in 2012. As its name implies, the clinic focuses on lupus-related kidney inflammation, a potentially deadly complication. Up to half of all SLE patients and nearly 70 percent of Hispanic and African-American patients with the disease will develop lupus nephritis. Left unchecked, kidney inflammation can cause irreversible kidney scarring, which can result in organ failure.

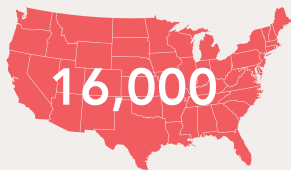
“End-stage kidney disease is the last thing we want for our patients,” says Beatrice Goilav, M.D., associate professor of pediatrics at Einstein, interim chief of pediatric nephrology at CHAM, and co-director of the Lupus Nephritis Clinic. “It reduces the life expectancy of a child or young adult on dialysis by four decades.” The only alternative is transplantation, which is limited by the availability of donor organs and carries its own risks and complications. That's the route taken by young pop star Selena Gomez, perhaps the world's best-known lupus patient, who received a donated kidney in 2017, at age 25.

FLARE-UPS AND FOLLOW-UPS

CHAM's Lupus Nephritis Clinic offers patients access to every type of specialist they might need in a single visit, including a rheumatologist, nephrologist, dermatologist, social worker, and nutritionist. Clinic staff also tend to the psychosocial aspects of lupus, such as treatment noncompliance. It's not uncommon for young patients to take a “drug holiday”—a respite from their

LUPUS FACTS

The use of the word “lupus”—Latin for “wolf”—for this disease is commonly attributed to Rogerius, a 13th-century Italian physician who observed that the facial lesions in lupus patients resembled the injuries left by wolf bites.



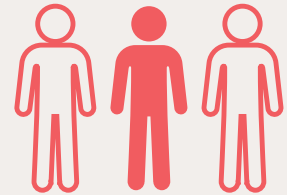
ANNUAL CASES

An estimated 16,000 new lupus cases are diagnosed yearly in the United States, according to the Lupus Foundation of America.



LIFE SPAN

Some 10 to 15 percent of lupus patients will die prematurely because of complications from the disease.



HEALTH CONDITIONS

One out of every three lupus patients suffers from multiple autoimmune diseases.



MENTAL HEALTH

50 percent of lupus patients report having emotional problems associated with their disease.



CHRONIC PAIN

65 percent of patients cite chronic pain as the most difficult aspect of lupus.



INCOME

In a 2012 Lupus Foundation of America survey, two of every three lupus patients reported that their disease led to complete or partial loss of income.



DEMOGRAPHIC

A major study found that African-American lupus patients have more-active disease and lower levels of social support compared with white lupus patients.



APPROVED DRUG

Belimumab (Benlysta), the newest drug approved for treating lupus, is a monoclonal antibody that works by targeting immune-system B cells that produce lupus autoantibodies.



DISABILITY

The Lupus Foundation of America survey also found that one-third of patients were temporarily disabled by the disease, and one in four was receiving disability payments.



demanding medication regimens and the drugs' sometimes onerous side effects, such as acne and weight gain. "After all, they're teenagers," says clinic co-director Dawn Wahezi, M.D., associate professor of pediatrics at Einstein and division chief of pediatric rheumatology at CHAM. "They just want to feel normal."

But such holidays have a cost: When patients don't take their meds, the disease often flares. "Then we have to hit them hard with steroids to control the kidney inflammation," Dr. Goilav says. "The Lupus Nephritis Clinic allows us to follow up with these kids very closely. The more we see them and get to know them, the more things we can do to improve compliance."

Staff are also on hand to help patients who suffer from central nervous system complications of lupus (CNS lupus), including stroke, depression, anxiety, and "lupus fog," a constellation of cognitive abnormalities including memory problems and confusion. "These complications aren't always life threatening, but—like lupus nephritis—they have a profound effect on overall health and quality of life," Dr. Rubinstein says. Making matters worse, CNS lupus in children is especially difficult to diagnose, leading to treatment delays.

"I was depressed for two years," Cynthia says. "The medications. The fatigue. Being home all day. Having to watch myself gain weight. It adds up."

The Lupus Nephritis Clinic at Children's Hospital at Montefiore keeps track of patients' progress. Standing, from left, are Beatrice Goilav, M.D.; Diana Lee, M.D., Ph.D.; and Dawn Wahezi, M.D. At the computer is Dianna Llenas, L.P.N.

DEPRESSION
FATIGUE
DIFFICULTY
THINKING

LIVING WITH LUPUS

Dr. Rubinstein is now running a multicenter study to find out how best to screen for mental illnesses in children and adolescents with lupus. Her research will also investigate risk factors for CNS lupus and assess how stress and adversity affect lupus outcomes.

At age 21, patients “graduate” from the pediatric lupus clinic to its adult counterpart at Montefiore or to outside caregivers. It’s the first time that many young patients have had to make decisions about their care, arrange doctors’ appointments, fill prescriptions, and file insurance claims—the nitty-gritty of managing a chronic illness.

“It’s a particularly stressful and vulnerable time in their lives, when they are transitioning out of high school and going to college or into the workforce,” Dr. Wahezi says. “It’s also when anxiety and depression tend to peak in lupus.”

Staff begin preparing patients for this transition months and sometimes years in advance. “When the time comes, we do our best to communicate with their new physicians and co-manage the patients for a time,” Dr. Wahezi says. “It’s tough all around. We develop quite a bond with these young patients.”

NEW COMPLICATIONS

Cynthia, now 22, hasn’t experienced a major flare-up in many months, but her disease is hardly quiescent. Lately, she’s been dealing with migraines and chest pains (from serositis—the inflammation of the membrane surrounding her heart). Even worse, she has developed signs of lupus nephritis. Like most lupus patients, Cynthia had no idea that her kidneys were faltering. The first indication came from a routine urine test, revealing that her kidneys were having trouble filtering waste from her blood.

“I can’t tell you how frustrating this was for us,” Dr. Blanco says. “We had her on full-dose drugs to prevent nephritis. And she’s a model patient, doing everything right.” Dr. Blanco immediately scheduled Cynthia for a kidney biopsy to confirm the results of the urine test.

Cynthia’s biopsy revealed that her kidneys were inflamed, but fortunately there were few signs of scarring. Around the same time, however, her joint pain returned. Dr. Blanco started her on rituximab (sold as Rituxan or MabThera), a powerful drug used for certain types of autoimmune diseases. “But then she developed an allergy to the drug—part and parcel of managing patients with this disease,” Dr. Blanco says with evident frustration.

The kidney biopsy is the gold standard for diagnosing and staging lupus nephritis. When examining kidney tissue from lupus patients, pathologists have tended to focus on the kidney’s glomeruli, which are clusters of capillaries that filter the blood. Largely ignored were the tubules—small canals in the kidney that convert the filtered blood into urine. Tubule damage was thought to have little prognostic value, since it was assumed to be a consequence rather than a cause of long-standing lupus nephritis. But after mouse-model studies hinted at the importance of tubule damage in lupus, Einstein-Montefiore researchers assessed tubules in the clinical setting.

“When we looked at kidney biopsies from 131 lupus patients with normal or mildly impaired kidney function, we found that many already had severe tubular scarring, which strongly predicted—independent of glomerular damage—that they’d progress to end-stage renal disease in a short time,”

“It’s tough all around. We develop quite a bond with these young patients.”

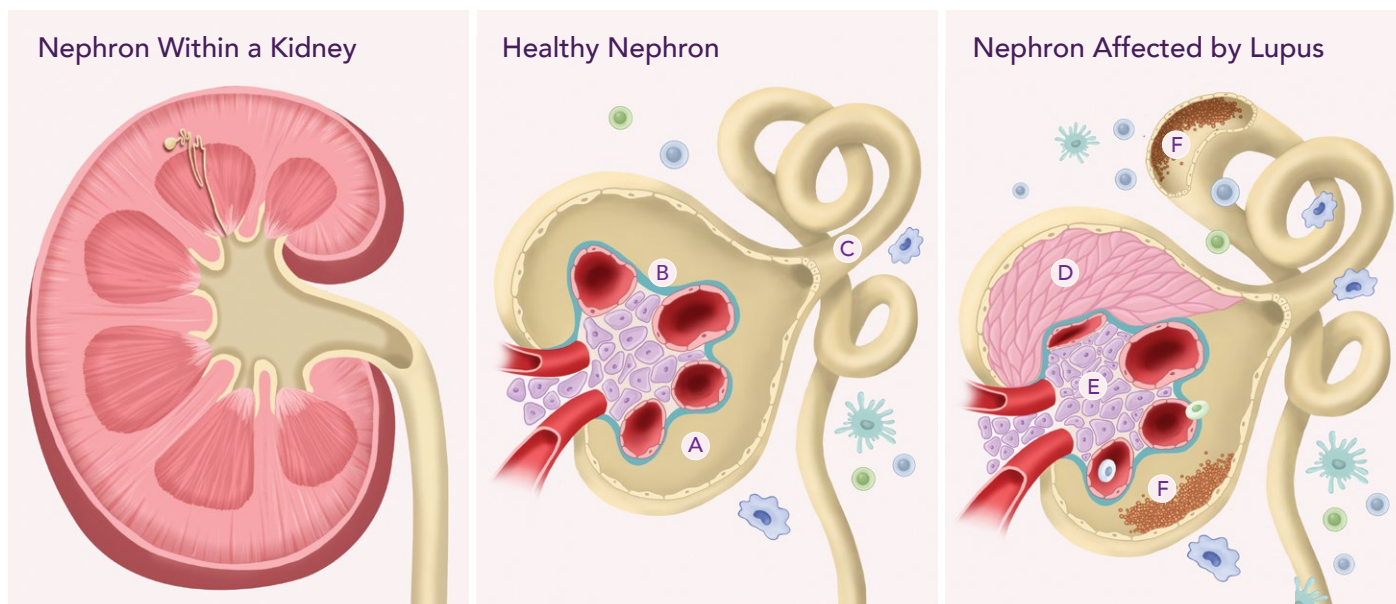
— DR. DAWN WAHEZI

Cynthia Vasquez, at right, chooses from among many different drugs she needs to keep her lupus under control.

**KIDNEY
DAMAGE
JOINT
PAIN
FEVER**



LIVING WITH LUPUS



A kidney (above left) contains about 1 million blood-filtering units called nephrons, each with a glomerulus (a cluster of tiny blood vessels) and a tubule (see healthy nephron, center). Blood is filtered by vessels of the glomerulus (A), and the filtrate (the filtered solution) travels through the glomerular basement membrane (B) into the tubule (C), which reabsorbs essential filtered substances and transports wastes that end up in urine. The image

at right shows how lupus nephritis (kidney inflammation) damages nephrons and their blood-filtering ability. In the glomerulus, vessels are crushed by multiplying layers of cells called crescents (D) that form scar tissue, and by multiplying structural support (mesangial) cells (E). Deposits of immune complexes (F) activate local and immune cells, triggering an inflammatory response that damages both the glomerulus and tubule.

Concept: Samantha Chalmers, Ph.D.; Illustration: Tatyana Starikova Harris

says Anna Broder, M.D., M.Sc., associate professor of medicine at Einstein and a rheumatologist at Montefiore. The results were published in 2018 in *Seminars in Arthritis and Rheumatism*.

“For some of these patients, tubular damage occurred long before obvious glomerular disease developed,” Dr. Broder says. “So treating early tubular inflammation—the cause of tubular damage—may help prevent end-stage renal disease and improve survival.”

In a study examining kidney biopsies from 203 lupus patients, Dr. Broder and her colleagues found that taking the drug hydroxychloroquine was strongly associated with reduced tubule inflammation. The lead author of that study, published in 2018 in *Arthritis & Rheumatology*, was Montefiore rheumatology fellow Alejandra Londono Jimenez, M.D. The

researchers are planning further studies to confirm hydroxychloroquine’s ability to prevent kidney-tubule damage.

A BIOPSY ALTERNATIVE

While biopsies are essential for assessing the kidney health of lupus patients, doctors would prefer to limit their use. “Kidney biopsies are a routine procedure but are still invasive,” says Chaim Putterman, M.D., professor of medicine and of microbiology & immunology and chief of the division of rheumatology in the department of medicine at Einstein and at Montefiore. “When you take a large needle and stick it into a highly vascular organ, it’s not surprising that one side effect can be bleeding.”

Skin biopsies may offer an alternative. “Blood vessels in the skin are exposed to the same circulating immune

factors as blood vessels in the kidney,” Dr. Putterman says. “So one hypothesis we are studying is that the skin may mirror what is going on in the kidney.”

Until recently, testing this assumption would have been difficult if not impossible. Now a new tool called single-cell RNA sequencing (scRNA-seq) offers researchers a detailed glimpse at the inner life of a cell, including what genetic pathways are active and which genes are driving those pathways.

Dr. Putterman and his colleagues biopsied the kidneys of lupus patients with nephritis and used scRNA-seq to assess the gene-expression profiles of individual tubule cells. Cells from all patients exhibited heightened expression of genes known to be activated by interferon—an inflammatory chemical that contributes to tissue damage in

patients with lupus. Moreover, when scRNA-seq was performed on individual skin cells of lupus nephritis patients and of healthy controls, interferon-responsive genes were activated in the patients' skin cells but not those of the controls. These findings, generated by a team led by Evan Der, a Ph.D. student in the Putterman laboratory, and reported in 2017 in *JCI Insight*, suggest that scRNA-seq analysis of skin cells could one day replace routine kidney biopsies.

In a second scRNA-seq study, published in abstract form in 2018 in *The Journal of Immunology*, Dr. Putterman, Mr. Der, and colleagues found that scRNA-seq analysis of kidney cells could differentiate among several types of lupus

nephritis and predict which patients would not respond to standard treatment to suppress the immune system.

“Clinically, using scRNA-seq to predict treatment outcomes would be a huge advance,” Dr. Putterman says. “We now start off treating patients with drug A and, if that hasn't worked after a few months, we then move to drug B. With scRNA-seq testing, we could promptly tailor treatment to a patient's particular type of nephritis and predict which patients will require especially aggressive therapy to prevent end-stage kidney disease.”

Both studies were conducted as part of the Multi-Ethnic Translational Research Optimization (METRO) study, a collaborative effort involving scientists at

The findings suggest that scRNA-seq analysis of skin cells could one day replace routine kidney biopsies.

Dr. Chaim Putterman, center, with Samantha Chalmers, Ph.D., and Ariel Stock, M.D., Ph.D.



SEEKING THE WHYS & HOWS OF LUPUS



One might expect that hormones, estrogen in particular, would contribute to a disease that mainly strikes young women. But their role in lupus—while important—is far from clear. For example, some studies in which female lupus patients are prescribed estrogen, either via birth control pills or as postmenopausal therapy, have found no significant increase in disease activity.

Genes are also important in lupus, with more than 50 gene variants associated with the disease. In addition, 20 percent of lupus patients have a parent or sibling who already has lupus or develops it. Yet “lupus genes” aren’t a sufficient cause, since the chance that an identical twin of a lupus patient will also develop the disease is between 15 and 25 percent. Unidentified factors such as viruses probably trigger lupus in genetically susceptible people.

Organ damage in lupus and other autoimmune diseases can result from antibodies directed against the body’s own tissues. To diagnose lupus, doctors look for autoantibodies unique to the disease: those made against double-stranded DNA. Presumably, the immune system encounters double-stranded DNA when cells die and spill their DNA into the blood. But how do the resulting anti-double-stranded-DNA antibodies cause the destructive inflammation that characterizes lupus?

In seeking the mechanism for antibody-caused inflammation, lupus researchers have focused on lupus nephritis, a leading cause of mortality

among systemic lupus erythematosus patients. Finding the answer could lead to strategies for preventing lupus inflammation from occurring, both in the kidney and elsewhere in the body. Several theories have been proposed.

Antibodies bind to double-stranded DNA to form large molecular complexes, and the kidneys filter a quarter of the body’s blood (along with those large complexes) every minute.

Many lupus experts have theorized that these antibody-DNA complexes become stuck in the kidney and, in so doing, trigger kidney inflammation.

“The problem with that theory is the lack of evidence that the kidney has difficulty clearing those antibody-DNA complexes,” says Chaim Putterman, M.D., professor of medicine and microbiology & immunology and chief of rheumatology at Einstein and Montefiore.

“Instead,” says Dr. Putterman, “those antibodies are probably cross-reacting with an antigen that resembles DNA, and our research strongly suggests they’re binding to an antigen on kidney cells. But it’s likely there are several ways by which anti-DNA antibodies damage the kidney.”

Other autoantibodies—antiphospholipid antibodies—increase the risk that lupus patients will have recurrent miscarriages. Phospholipids are normal cellular components; antibodies against them can cause blood clots to form, which may contribute to miscarriage by preventing blood from reaching the placenta. By taking anticlotting drugs such as aspirin, female lupus patients diagnosed with antiphospholipid antibodies have an excellent likelihood of successful pregnancies.

Einstein, New York University School of Medicine (led by Jill Buyon, M.D.), and Rockefeller University (led by Hemant Suryawanshi, Ph.D., and Thomas Tuschl, Ph.D.), to leverage the power of scRNA-seq to decipher the molecular biology of lupus nephritis.

METRO in turn is part of the Accelerating Medicines Partnership program in rheumatoid arthritis and lupus, a unique partnership of the National Institutes of Health, pharmaceutical companies, and nonprofit organizations to develop novel lupus drugs by identifying promising new biological targets.

INDIVIDUALIZING TREATMENT

One of METRO's goals is to use scRNA-seq to better subclassify lupus patients. "Physicians tend to be 'lumpers,'" says Dr. Putterman, who is leading Einstein's component of the project. "So if you have a rash, along with arthritis and kidney disease, we call it lupus. But scientifically, that might not be correct. From mouse studies, we know that knocking out a gene in any one of 20 different immune pathways can lead to the same phenotype—lupus. So at least in the mouse and probably in humans as well, lupus is not one disease but rather several different diseases with a common set of symptoms. We have blanket treatments, when what we need are individualized treatments to address the biology underlying each type of lupus."

METRO is also using scRNA-seq to investigate how race and ethnicity affect biological pathways in lupus. "If lupus differs from one population to another at the molecular level, as we suspect it does," Dr. Putterman says, "these studies could help identify molecular targets for drug treatment so we can use our therapies more precisely."



Cynthia Vasquez cuddles her 4-year-old son, Daniel.

WHAT'S NEXT FOR CYNTHIA

"It's hard to know Cynthia's prognosis," Dr. Blanco says. "I do worry that she is going to be one of the tougher cases." Still, Cynthia seems to have come to terms with her daily battle, perhaps because she has a purpose: a son to raise. And she feels lucky to have the support of her partner, her father, her mother (herself a lupus patient), and many capable and attentive doctors at Einstein and Montefiore. "Always take advantage of your life," she advises. **E**

PREVENTION
HOPE
TREATMENT



READ MORE

Discover how Einstein scientists are clearing up cutaneous lupus with nanoparticles:

magazine.einstein.yu.edu/nano19

PASSIONATE PURSUITS

A Plant Kingdom of Bronx Beauties

BY GREG DAUGHERTY

Catherine Vilcheze, Ph.D., carries her camera along nearly everywhere she goes, snapping hundreds of shots of landscapes, cityscapes, animals, and plants. But what she sees through the camera's lens isn't always what appears on paper. That's because she digitally transforms many of the images into eye-catching creations not found in nature. "I just like to take pictures—and change them," she says.

The images on these pages are products of that passion. All began as conventional photographs of plants, taken by Dr. Vilcheze with her Nikon D3000 digital single-lens reflex camera. She then downloaded them to her computer, where she uses a software program called Topaz Adjust to manipulate the images' colors and create other effects.

"Every time I put a picture on my

computer and start playing with it, I never know what I'm going to get," she says. "I'm really happy when it works. I'll say 'Wow—that looks good.'"

Still, she says those "wow" moments can be few and far between. "About 80 percent of the time I'm unable to make something I'm satisfied with," she says. "It's a little like doing research. In the lab about 80 percent of your research fails."



A FOCUS ON NATURE

As a research assistant professor of microbiology & immunology at Einstein, Dr. Vilcheze, above, looks for ways to improve tuberculosis drug therapy. She received her doctoral degree in organic chemistry from the Université de Haute-Alsace in Mulhouse, France, and came to Einstein in 1998.

Nature is a favorite photographic subject for her, particularly at the New York Botanical Garden in the Bronx. Another favorite is her native Paris.

Growing up in the Paris suburb of Champigny-sur-Marne, Dr. Vilcheze says, she took the city's beauty for granted. "Now every time I go back home I see it differently. It's a very walkable big city, and there are pictures around every corner. But I never saw any of this when I was growing up. I had to leave to find the magic of it."

DIGITAL CREATION

Dr. Vilcheze came relatively late to photography, buying her first camera when she was in her twenties for a trip to Egypt. Years later, a photographer friend introduced her to the wonders of photo software, in particular a technique called high-dynamic-range photography, or HDR, which allows a photographer to take multiple shots of an image at different exposures and then combines them into a single image.

While any individual photo might have overexposed or underexposed areas because of the camera's limitations,



The lush variety of plants found in the New York Botanical Garden and the Wave Hill Hill Public Gardens, both in the Bronx, serves as the inspiration for Dr. Vilcheze's photos. She transforms the greenery into multihued creations on her computer.

HDR solves that problem. A photographer can use it to produce an image with a greater range of lights and darks, often resulting in stunningly vivid color.

Dr. Vilcheze's plant photos incorporate HDR and other digital manipulations. She can work on an image for hours before achieving a result that makes her happy.

Through trial and error, she has learned that plants that start out as all green work best, no matter what colors they'll wear when she's done with them. She also likes plants with parts that turn inward or outward. "It's all about shape and shadow," she says.

Even then, she admits, she never knows if a particular plant will work until she has taken a photograph, brought it home, and started playing with it on her computer.

Dr. Vilcheze has published her photographs in *Ad Libitum* (the annual literary and art magazine showcasing the work of Einstein's students, faculty, and staff) and has exhibited at *Ad Libitum's* annual art night, held each January. But she hasn't given any thought to selling copies of her work.

"To me, it's just a personal thing," she explains, "but I'm happy when people say they like the photographs." **E**





SHINING A LIGHT ON THE HUMAN BRAIN

BY GARY GOLDENBERG

Einstein researchers are using optogenetics to tackle the ultimate scientific challenge

Scientists have been poking and prodding the brain for centuries in hopes of learning how this gelatinous mass of billions of interconnected neurons influences thoughts, emotions, movement, mental and behavioral problems, and just about everything else that makes us human.

One of the great advances in neuroscience came in the 1930s, when a surgeon named Wilder Penfield used electrodes to explore the brains of epilepsy patients. Stimulating different parts of the brain with electricity revealed which regions control what movements, allowing him to identify areas to avoid during surgery. Penfield's findings led to the first functional map of the motor areas of the brain.

Until recently, electrical stimulation remained the go-to method for studying the brains of experimental animals, revealing the actions controlled by different parts of the brain and their various specialized neurons. But the technique had serious drawbacks. Inserting electrodes into the brain can damage the very cells under study. And electrical stimulation was imprecise and nonselective, so it was impossible to know exactly which neurons were being activated.

In 1979 Francis Crick (who by then had turned his attention from DNA to neuroscience) made a suggestion: Researchers hoping to decode the brain would need to manipulate one type of neuron without altering any of the others. Light, he surmised, could provide a precise, nondestructive solution. Crick was on to something, but it would take decades for science to catch up.

The first component of this futuristic tool was already at hand. In the early '70s, researchers discovered that certain

microorganisms contain opsins—light-sensitive proteins that regulate the flow of an electric charge across cell membranes. Thanks to virus-mediated gene delivery, developed in the 1980s, the genes for opsin proteins could be inserted into neurons; when those genes become activated, the cells start synthesizing light-sensitive opsin proteins.

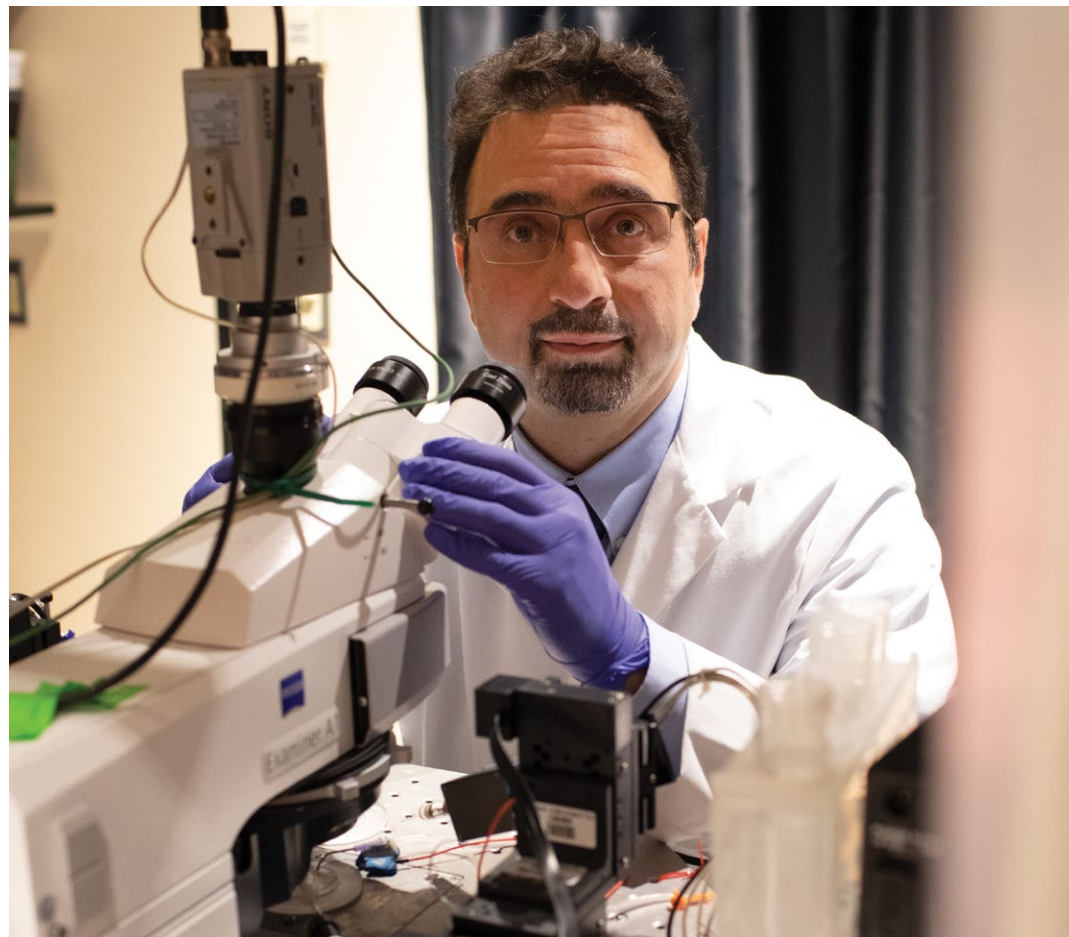
The final key component: the availability of long, slender optical fibers (similar to the kind that bring the Internet into homes) that could shine pulses of light on opsin-containing neurons almost anywhere in the brain. With the literal flick of a switch, this marriage of optics and genes—"optogenetics"—could now turn

neurons and other cells in a living organism on or off (depending on the opsin).

In 2010, *Nature Methods* chose optogenetics as its Method of the Year. By now the technique has found its way into thousands of laboratories around the world. Here's how four labs at Einstein are using the transformative effects of light to illuminate science.

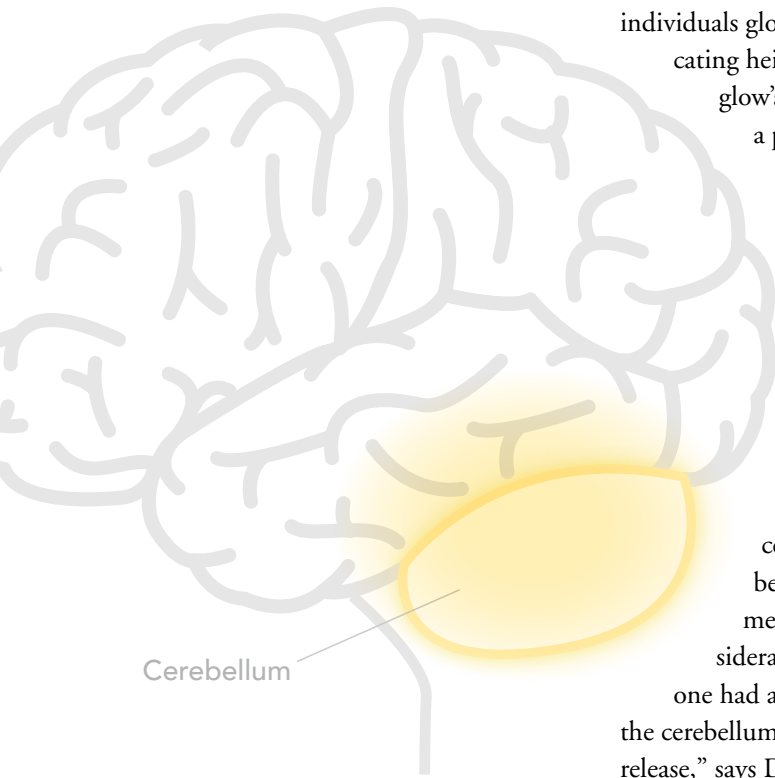
THE KHODAKHAH LAB: Linking the Cerebellum to Addiction

Dating back to Galen, a second-century Greek physician, biologists



Kamran Khodakhah, Ph.D.

SHINING A LIGHT ON THE HUMAN BRAIN



have believed that the main role of the cerebellum—a fist-sized brain structure located just above the brain stem—is to coordinate movement. But through the use of optogenetics, Einstein's Kamran Khodakhah, Ph.D., has shown for the first time that the brain's cerebellum also helps control the reward circuitry underlying addiction. The surprising finding, published in January 2019 in *Science*, suggests a major role for the cerebellum in social behaviors and could lead to novel addiction therapies.

Previous studies had hinted that the cerebellum's talents were underappreciated. For example, several functional magnetic resonance imaging (fMRI) studies, which measure blood-flow changes that occur with brain activity, involved people recovering from addiction who were shown syringes or other images associated with their addiction. Unexpectedly, the cerebella of those

individuals glowed on fMRI scans, indicating heightened activity, and the glow's intensity correlated with a person's risk of relapse.

This and other evidence suggested that the cerebellum was somehow involved in triggering the release of the feel-good neurotransmitter dopamine in brain areas that received rewarding stimuli.

"The idea that the cerebellum did much beyond controlling movement was met with considerable skepticism—and no one had any real clues as to how the cerebellum might affect dopamine release," says Dr. Khodakhah, professor and chair of the Dominick P. Purpura Department of Neuroscience and the Florence and Irving Rubinstein Chair in Neuroscience.

For Dr. Khodakhah, all signs pointed to an as-yet-undiscovered link between the cerebellum and the ventral tegmental area (VTA), a nearby structure known to play a role in addiction. VTA neurons synthesize and release dopamine into the mesolimbic pathway, which mediates pleasure and reward (see "Einstein Image" on the back cover). "However," he says, "conventional tools for looking at brain anatomy could never tell us whether cerebellar neurons directly connected with the VTA, or if they simply passed by en route to other destinations."

Dr. Khodakhah and his colleagues turned to optogenetics to provide the answer. Their research involved inserting opsin genes into mouse cerebellar neurons, which then processed the

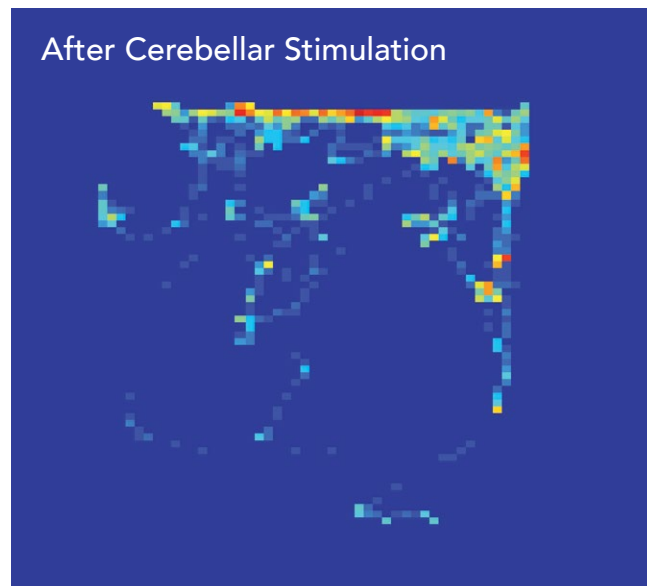
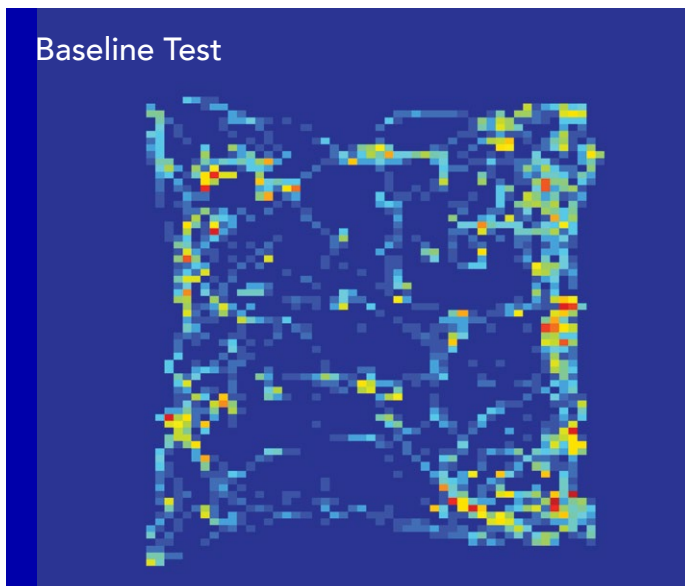
genes into light-sensitive opsin proteins. Exposing those neurons to light would selectively activate or inactivate the treated neurons, depending on the particular opsin used.

In an initial experiment, Dr. Khodakhah's team inserted opsin genes into certain cerebellar neurons: those whose long fibers, known as axons, connected with the VTA. When these neurons were exposed to light, the VTA responded with measurable electrical activity. Since only opsin-containing cerebellar neurons could have been activated by the light, this experiment proved for the first time that cerebellar neurons form working synapses (connections) with VTA neurons.

To see whether those connections influence behavior, Dr. Khodakhah conducted a so-called open-field chamber test, in which mice were free to explore any corner of a square enclosure. Each time a mouse reached a particular corner (randomly chosen for each mouse), cerebellar neurons linked to the VTA were optogenetically stimulated.

If the mice found this stimulation pleasurable, they'd be expected to preferentially return to this corner (to get another rewarding flash of light) instead of to the other corners—and they did, much more so than occurred with control animals. (See images on next page.)

Could stimulating cerebellar projections to the VTA trigger "addiction" in mice? To find out, Dr. Khodakhah and colleagues put mice in a chamber that was half dark and half brightly lit. Since mice prefer dark areas—the better to avoid becoming a predator's next meal—they spent more time exploring the dark part of the chamber. The researchers then repeated the experiment—except this time, every other day



STIMULATING THE REWARD CENTER. Heat maps show how much time a mouse spends exploring the four corners of a square enclosure (warmer colors equal greater number of visits). Map at left shows time spent in the four corners before

researchers optogenetically stimulated cerebellar axons in the mouse's VTA whenever it entered the upper-right quadrant. At right, the mouse preferentially returns to the upper-right corner, presumably hoping for more pleasurable stimulation.

for six days, mice were confined to the bright side for 30 minutes while cerebellar axons with connections to the VTA were optogenetically stimulated. After that initial conditioning period, the mice were allowed to freely explore the entire chamber.

“Even though mice normally shun bright areas, now they ran toward the light, because that’s where they remembered getting a reward,” Dr. Khodakhah says. “This suggests that the cerebellum plays a role in addictive behaviors.”

He notes that the results were “very similar” to findings in other studies in which mice confined to the bright part of chambers received addictive drugs, such as cocaine, instead of cerebellar stimulation.

Cerebellum abnormalities have been implicated in autism spectrum disorder (ASD), although how the cerebellum contributes to ASD isn’t clear. Because the VTA is required for social behavior,

“Even though mice normally shun bright areas, now they ran toward the light, because that’s where they remembered getting a reward.”

— DR. KAMRAN KHODAKHAH

Dr. Khodakhah and colleagues tested whether the cerebellum-VTA pathway might be involved. They placed mice in a three-chambered box in which they were free to travel to either an inanimate object, another mouse, or an empty chamber. The activity of cerebellar axons within their VTA was monitored.

The mice being studied typically spent most of their time socializing

with other mice—and when they did, cerebellar axons in their VTA were most active, consistent with the idea that the cerebellum relays information relevant to social behavior to the VTA. Intriguingly, when researchers optogenetically silenced cerebellar axons projecting into the VTA, the mice no longer preferred interacting with other mice.

This finding suggests that social behavior requires a functioning cerebellum-VTA pathway and that interference with this pathway may be a glitch through which cerebellar dysfunction contributes to ASD. “It would have been extremely difficult to make these discoveries without this technique,” Dr. Khodakhah notes.



WATCH THE VIDEO

See the mice in action in Dr. Khodakhah’s lab and learn more about the cerebellum.

magazine.einstein.yu.edu/brain19



Anita Autry-Dixon, Ph.D.

THE AUTRY-DIXON LAB: Investigating the Neurobiology of Parenting

Filicide—the murder of one’s own child—may be the most horrific of all crimes. But it occurs about 500 times a year in the United States, according to a 2014 study in *Forensics Science International*. Mothers are nearly as likely as fathers to be involved, and the vast majority of killers are biologically related to their victims.

The neurobiological basis for this behavior may lie deep within the hypothalamus, according to research by Anita Autry-Dixon, Ph.D., assistant professor in the Dominick P. Purpura Department of Neuroscience and of psychiatry and behavioral sciences. She studies the neural circuits that control parental behavior—both good and bad.

“We’re finding that a lot of these circuits exist in both males and females,”

Dr. Autry-Dixon says. “It’s natural to assume that mothers have ingrained parental behavior, of course, but so do fathers. For example, when a male mouse encounters a female, he attacks her pups so that he can have pups of his own with that female. What’s fascinating is that males stop killing pups about three weeks after they mate, which is exactly when their own pups would be born.”

Dr. Autry-Dixon recently identified a group of neurons in the mouse hypothalamus that is active during pup-directed aggression but not during normal parental behavior. In males, the use of optogenetics to silence those cells blocked pup-directed aggression, while optogenetically activating the neurons in females led to reduced maternal behavior and, in some cases, pup-directed attack—which normally is extremely rare among mouse mothers. She speculates that these neurons sit at the middle of a “social-stress circuit” in males and

females and that, under certain conditions, the neurons misfire and lead to aberrant parenting.

Now Dr. Autry-Dixon is defining the anatomy and function of this possible social-stress circuit in mice to determine how these neurons control pup-directed aggression. Again, optogenetics will play a key role in her research. Her findings may shed light on neurobiological mechanisms underlying filicide and could lead to new treatments for parenting-related disorders, such as postpartum depression and postpartum psychosis, that can affect both mothers and fathers.

“It’s interesting how much our neural circuits change in response to parenting,” she says. “In female mice, for example, a lot of oxytocin activity occurs in the brain’s auditory cortex, allowing mothers to respond quickly to pups’ vocalizations. I’m the same way with my 4-month-old and wake up immediately when I hear my baby cry. My husband asks, ‘Was the baby up last night?’ And I say, ‘Yeah, *six* times!’ Mothers’ sense of smell also changes throughout pregnancy and early motherhood, and none of us would be here if humans didn’t have some kind of parenting instinct.”

Dr. Autry-Dixon likes to frame her work in a larger context. “What has struck me is that the cultural narrative around motherhood differs so starkly from the actual experience,” she says. “There’s so much pressure on mothers but often no maternity leave to help them bond with their infants, and little support from our healthcare system. So the inability of some mothers to form a strong maternal-infant bond is driven mainly by societal flaws rather than being a mother’s ‘fault.’ That recognition could lessen the stigma preventing parents from getting the help they need.”

THE JO LAB:

Revving Up 'Good' Body Fat

Forgot your down jacket on a cold night? No worries—the human body has a couple of ways to trigger a metabolic process called thermogenesis, which means burning calories to produce heat.

A drop in your body's core temperature triggers receptors to send signals to the hypothalamus saying, in effect, "We're freezing down here; send help!" The hypothalamus, the body's thermostat, responds by telling muscles to contract and make you shiver—which burns calories and provides temporary warmth.

Less well known is a second, longer-lasting mechanism for generating heat: nonshivering thermogenesis. Here the hypothalamus sends signals to activate a special type of fat called "brown fat," which evolved to burn lipids in order to warm up mammals exposed to cold.

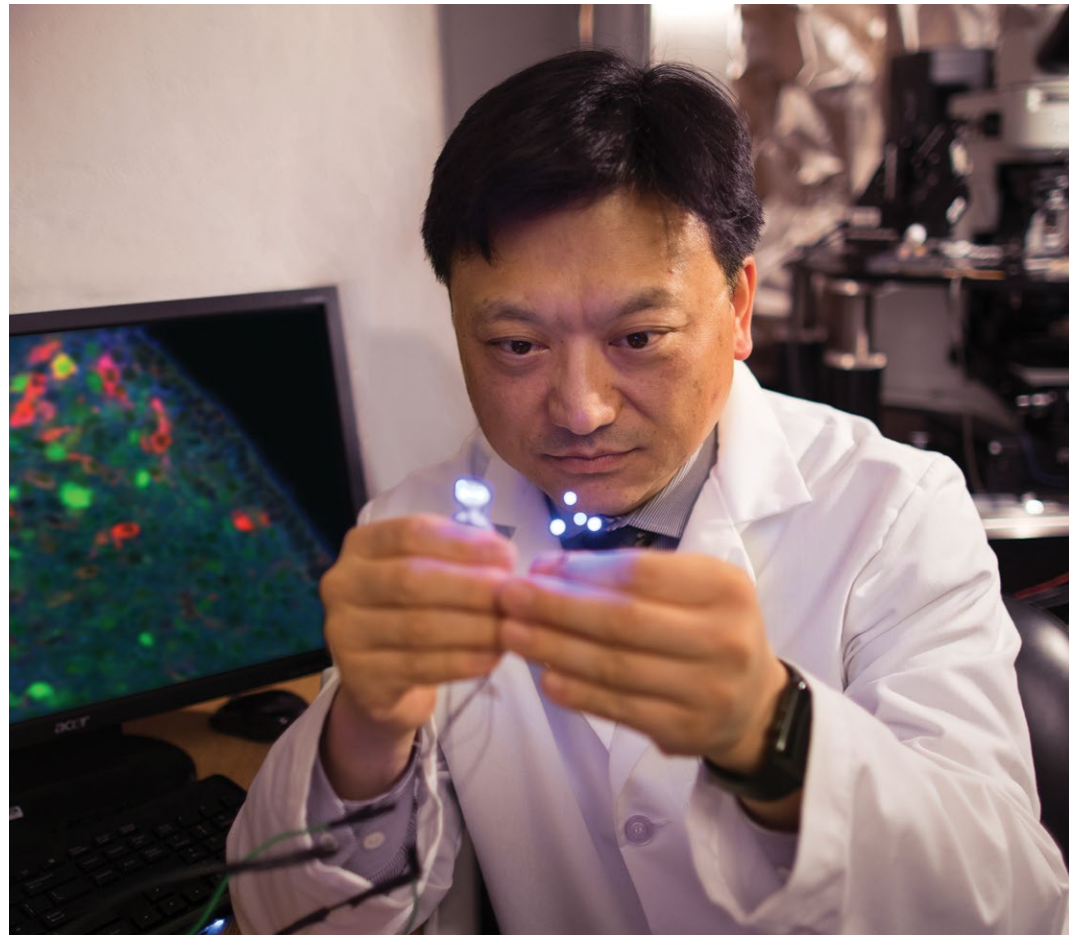
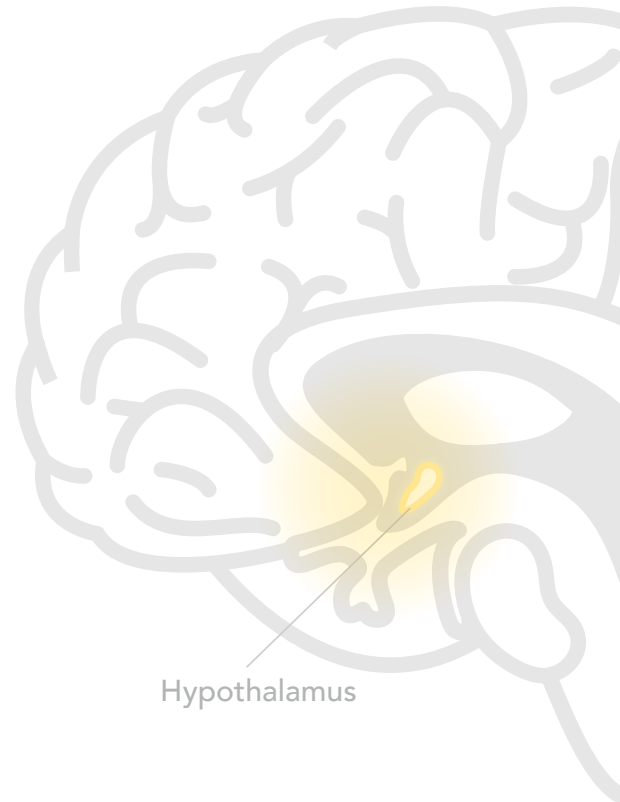
Brown fat is the healthy cousin of the better-known "white fat," which stores calories for future use but increases the risk of heart disease, diabetes, and other maladies. The cells of brown fat are dense with mitochondria, the iron-containing organelles that give brown fat its color. Those mitochondria contain a unique protein that diverts mitochondrial respiration from its usual task of converting nutrients into energy-rich molecules of adenosine triphosphate, which cells rely on to perform activities. Instead, brown-fat mitochondria act like tiny blast furnaces, devoted solely to burning nutrients to produce heat.

Brown fat is found mainly in the neck and shoulder regions of hibernating animals and many small mammals—including newborn humans, who lack the ability to shiver in response to cold. The small clusters of brown fat

that linger into adulthood were assumed to be physiologically unimportant.

But in 2009, three reports in *The New England Journal of Medicine* found not only that healthy adults possess significant amounts of brown fat but that the fat is also metabolically active. In one of the reports, exposing human volunteers to cold revved up their brown-fat activity fifteenfold, as measured by increased glucose uptake from the bloodstream (a reflection of brown-fat cells' high metabolic rate).

"Brown fat's ability to clear glucose means that activating it could help in treating or even preventing diabetes," says neuroscientist Young-Hwan Jo, Ph.D., associate professor of



Young-Hwan Jo, Ph.D.

SHINING A LIGHT ON THE HUMAN BRAIN

medicine and of molecular pharmacology. “Activated brown fat also expends energy by burning off large numbers of calories—and the resulting weight loss can especially help people with diabetes, as well as anyone who is overweight.”

Dr. Jo’s research has shown that optogenetics could be a promising alternative to freezing temperatures for activating brown fat. In a study published in *Molecular Metabolism* in 2015, he and colleagues inserted opsins into mouse neurons in a region of the hypothalamus and then used optical fibers to stimulate those neurons. The study conclusively demonstrated that neurons in the hypothalamus regulate brown-fat metabolism.

“This procedure is too invasive for humans, of course,” Dr. Jo says. But three years later, in a 2018 mouse study published in *Scientific Reports*, Dr. Jo used a noninvasive optogenetic technology to stimulate peripheral autonomic neurons. These nerves, in the back of the necks of mice, connect with brown fat directly below.

“We knew that blue light readily penetrates human and rodent skin,” Dr. Jo says. “So we expressed opsins in the neurons and then shone blue light

directly through the skin.” The underlying brown fat was successfully activated, as shown by nonshivering thermogenesis and lowered blood-glucose levels in the mice, reflecting metabolically active brown-fat cells taking up glucose from the bloodstream.

Dr. Jo and Einstein have applied for a patent on his noninvasive technology, which uses a computer-controlled pulse generator to emit bursts of light-pulses. Applications for Dr. Jo’s technology could extend beyond brown fat, because it can stimulate (or turn off) any nerves close to the skin surface. “For example,” Dr. Jo says, “we know that autonomic nerves in the liver play a crucial role in regulating the body’s blood-glucose concentrations. We hope that optogenetically stimulating those nerves can normalize the excessive blood-glucose levels in people with diabetes.”

THE KOHN LAB: Discovering the Ups and Downs of Vision

When we look at something—say, a tree in the middle of a field—light rays from this tableau pass through the cornea to the retina, whose light-sensing neurons (rods and cones) send electrical signals up to the visual cortex, the part of the brain’s cerebral cortex that processes visual information.

Signals undergo initial processing in the lower area of the visual cortex and then travel to upper areas for more refinement. They finally reach the prefrontal cortex, where we “see” the tree and

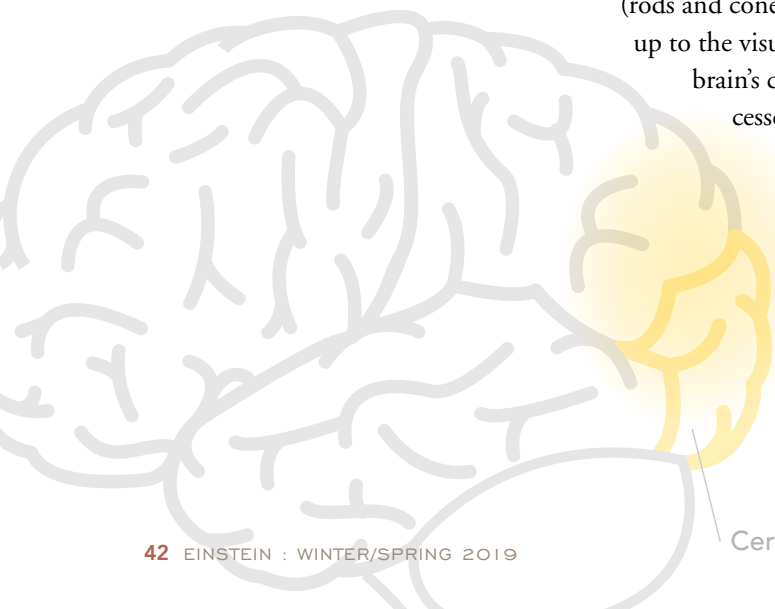
Optogenetics could be a promising alternative to freezing temperatures for activating brown fat.

the field. However, some of the visual information reaching the upper visual cortex makes an abrupt U-turn and is fed back to neurons in the lower visual area.

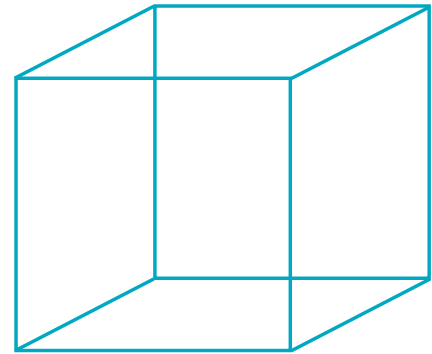
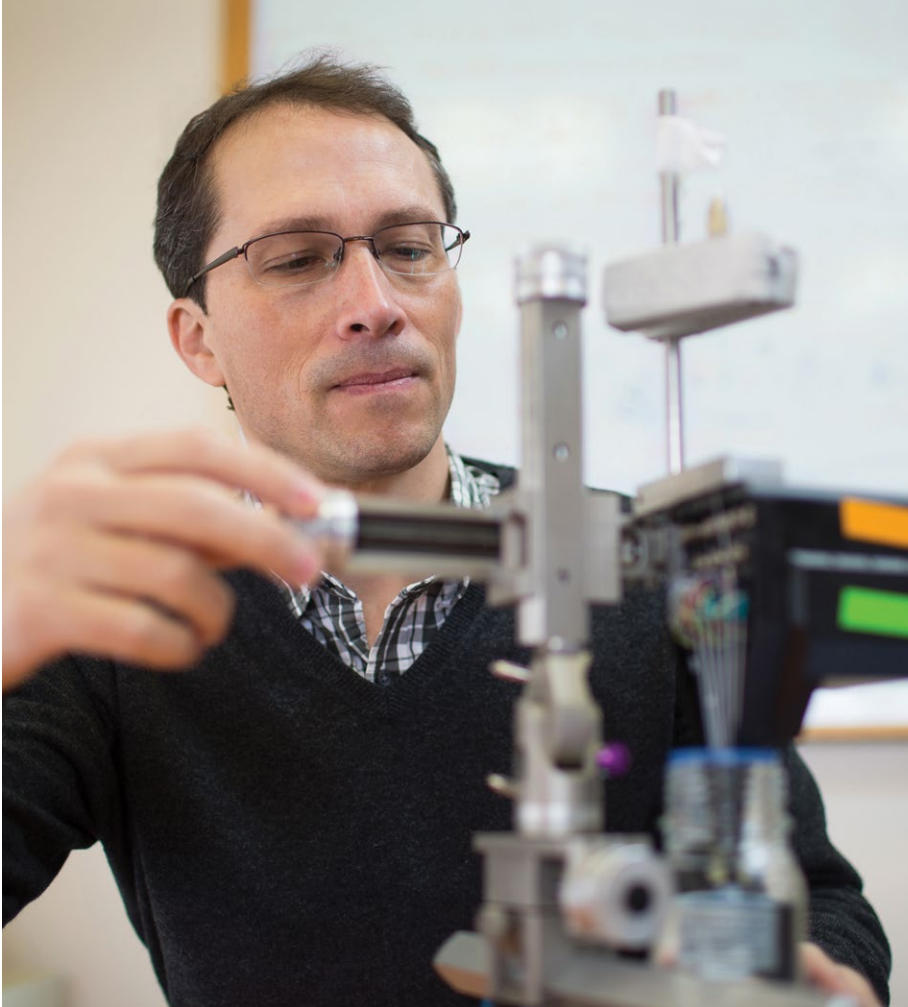
“Half the connections in the visual cortex transmit these upper-to-lower cortex feedback signals,” says Adam Kohn, Ph.D., professor in the Dominick P. Purpura Department of Neuroscience, of ophthalmology and visual sciences, and of systems & computational biology, and the Isidor Tachna Professor in Ophthalmology. “But experiments to map these signals have been lacking, so we don’t know what those signals are doing or how they might be influencing the images we ultimately perceive. Some research suggests that feedback signaling may cause the brain to make the sort of inferences seen in optical illusions.” (See Necker cube illusion, next page.)

Until recently, the only way researchers could assess the influence of feedback neurons on vision was to inactivate them (using drugs or cooling probes, for example) and then monitor the effects. But the downstream consequences were subtle and difficult to interpret.

For one thing, it was hard to know exactly which neurons had been inactivated. Also, the timing of the inactivation couldn’t be controlled—a



Cerebral Cortex



At left, Adam Kohn, Ph.D. Above, the Necker cube optical illusion, first published in 1832 by Swiss crystallographer Louis Albert Necker. The cube's lower-left square or its upper-right square may appear closest to you—or they may switch back and forth as you stare. Feedback signaling in the visual cortex may influence our perception of reality by causing the brain to make the sort of inferences seen in this and other optical illusions.

considerable downside in a circuit that works on a millisecond timescale. Finally, by the time the neurons were inactivated and the effects measured, the brain could already have compensated for the loss.

“Basically, we needed a way to control neurons that was instantaneous, reversible, and more precise,” Dr. Kohn says. “That was the promise of optogenetics.” Adapting that tool to vision would not be easy: Most optogenetics research had involved mice, which unfortunately are not good animal models for studying human vision. Nonhuman primates are ideal animal models for vision study, but little optogenetics research had been done on them.

“It took some time for us to learn how to get opsin genes into the right cells,” Dr. Kohn says. Once he did, he was able to selectively activate upper visual-cortex neurons while recording the effect on neurons in the lower cortex, a

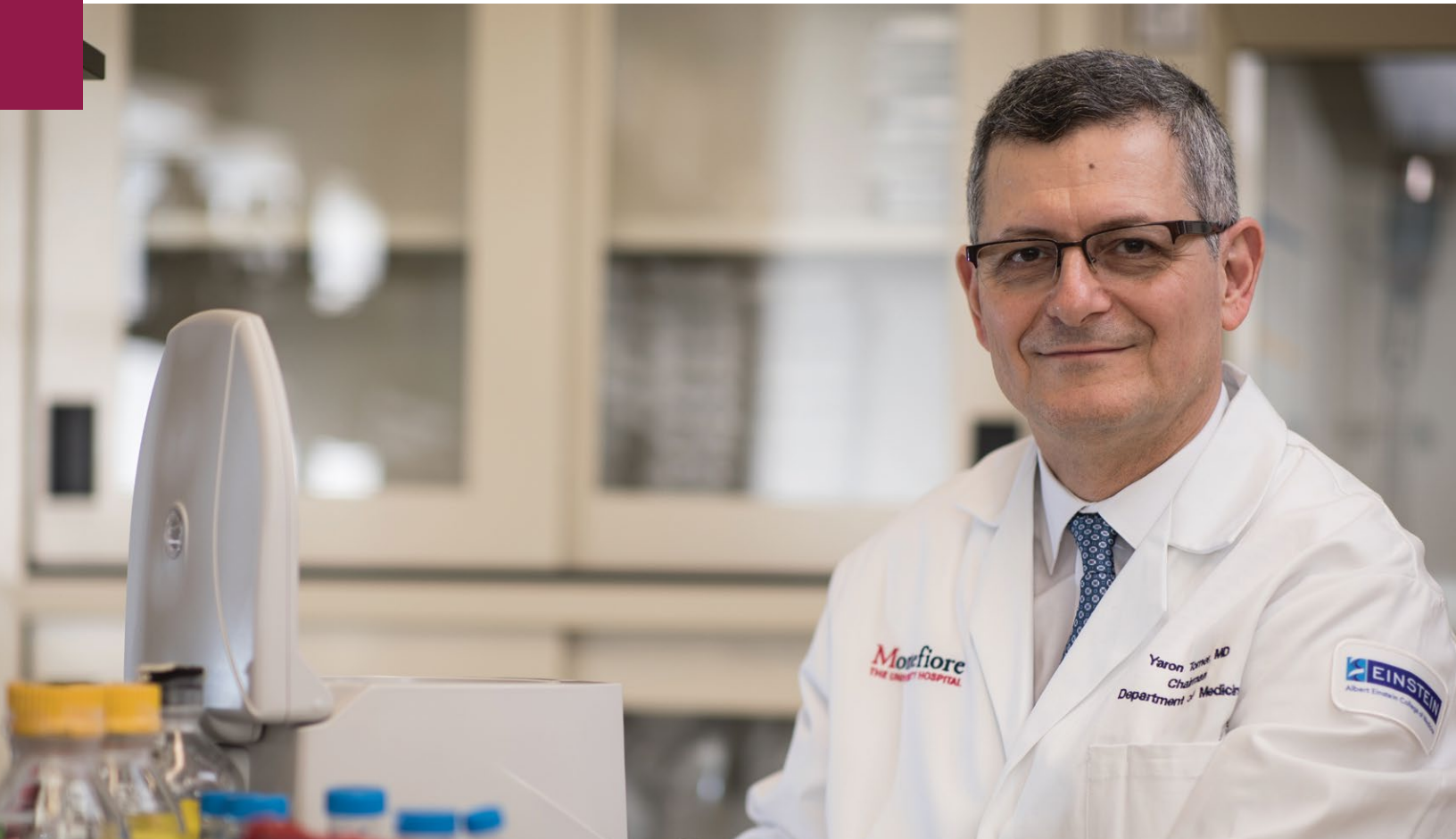
hundred neurons at a time. “If we use a musical analogy, what we could do before was hit the piano with a sledgehammer,” he adds. “What we can do now is use our fingers to play a few notes. But it would be really nice to be able to play a melody that mimics natural activity patterns in the brain and then observe the downstream effects.”

It's too early for Dr. Kohn to draw conclusions from his preliminary experiments. “We've seen very robust effects caused by manipulating feedback neurons, which itself is a big step forward,” he says. “The firing rate of the affected neurons changes, and so does their activity. When feedback signals are active, the lower cortical neurons appear to change from fluctuating together—that is, acting redundantly—to functioning independently. If these independently functioning neurons are each carrying different bits of information, then they might

provide us with a richer representation of the world. But we need to do more work to see if this is what is actually happening.”

Dr. Kohn's initial data are in line with current theories that feedback signals aid tasks such as figure-ground segregation (helping you separate the tree from the field) and predictive coding (helping you predict future locations of a moving object). His studies could have important implications for human health. “Disruptions in signaling between areas of the visual cortex have been implicated in schizophrenia, autism, and several other disorders,” Dr. Kohn says. “Gaining a better understanding of feedback circuitry could yield insight into the underlying causes of those disorders.” **E**

MONTEFIORE AND EINSTEIN MAVENS OF MEDICINE



Piecing Together the Puzzle of Autoimmune Endocrine Diseases

Q&A With
Dr. Yaron Tomer

Yaron Tomer, M.D., is professor and chair of medicine and the Anita and Jack Saltz Chair in Diabetes Research at Einstein and Montefiore. He was recruited from the Icahn School of Medicine at Mount Sinai, where he served as division chief of endocrinology, diabetes, and bone disease. Dr. Tomer is an active researcher, with a focus on finding the genetic and environmental factors that trigger autoimmune thyroid disease and type 1 diabetes.

Why did you choose endocrinology?

I wanted a specialty that requires analytical problem solving. In endocrinology, nearly every clinical scenario is a puzzle that you need to solve. In addition, when you're seeing a patient with an endocrine condition, solving the puzzle requires considering not only the clinical symptoms but also the molecular mechanisms that could explain the problem.

What influenced you to come to Einstein in 2015?

Of the many reasons, there were three unique attractions. First was Einstein's and Montefiore's commitment to social justice and to the Bronx community. Second was my ability as chair of medicine to have a much broader impact on patient care at a time when the U.S. healthcare system is undergoing a historic transformation from fee-for-service to value-based care. Finally, the merger between Einstein and Montefiore had just been announced, and leading the department of medicine during the unification presented an exciting opportunity to me, as well as a great privilege.

Do you have plans for promoting even closer ties between Einstein and Montefiore?

One of my goals is to create more bench-to-bedside collaborations, bridging basic research at Einstein with Montefiore's clinical capabilities. The new Fleischer Institute for Diabetes and Metabolism exemplifies what we aspire to achieve. The institute includes a new clinic we opened at 1180 Morris Park Avenue for treating patients and enrolling them in translational research and clinical trials.

Any initiatives to improve patient care?

Improving patient care is my highest priority. Drs. Sharon Rikin and Sarah Baron direct ambulatory quality improvement and inpatient quality, respectively, and are leading numerous projects. A year ago Dr. Rikin launched a very successful program called eConsult, a unique way to improve primary-care patients' access to specialty expertise. A physician submits a request in the patient's electronic medical record for a specialist's help; a dedicated specialist then determines whether a face-to-face consultation is needed or if the specialist can give advice remotely. This initiative has reduced the number of face-to-face consults by 55 percent, meaning that the majority of patients no longer have to wait weeks to see a specialist. We plan to expand eConsult throughout the medical center.

What about on the inpatient side?

Dr. Baron and members of the infectious diseases division are leading a highly successful effort to reduce the number of hospital-acquired *C. diff* infections, a serious and costly complication. In addition, Dr. Baron just launched a new task force to improve glucose management among inpatients with diabetes and other conditions.

What are some Bronx health problems that you're addressing?

First and foremost is the opioid epidemic, which has hit the Bronx harder than many other communities. We recently established an addiction center at Montefiore, under the leadership of Dr. Chinazo Cunningham, to better care for patients with addiction disorder. Other examples include programs to

meet the huge need for early detection of cancer and to care for patients with asthma, chronic obstructive pulmonary disease, and chronic kidney disease. We're also involved in a large project that screens people for hepatitis C and treats those found to be infected. So far, several hundred hepatitis C patients have been cured through this initiative.

Could you discuss an aspect of your own research?

My research focuses on two autoimmune endocrine diseases—autoimmune thyroiditis and type 1 (autoimmune) diabetes. Our goal is to block the T cells that attack the thyroid in thyroiditis and the pancreatic islets in type 1 diabetes. We've discovered a compound, which we've patented, that shows promise for treating autoimmune thyroiditis by blocking antigen presentation and T-cell activation. We're now developing other compounds for treating type 1 diabetes in the same way. I'm excited and hopeful about attempting to translate our mechanistic research findings from the past 20 years into new potential therapies for autoimmune thyroiditis and diabetes.

Have you read any good books lately?

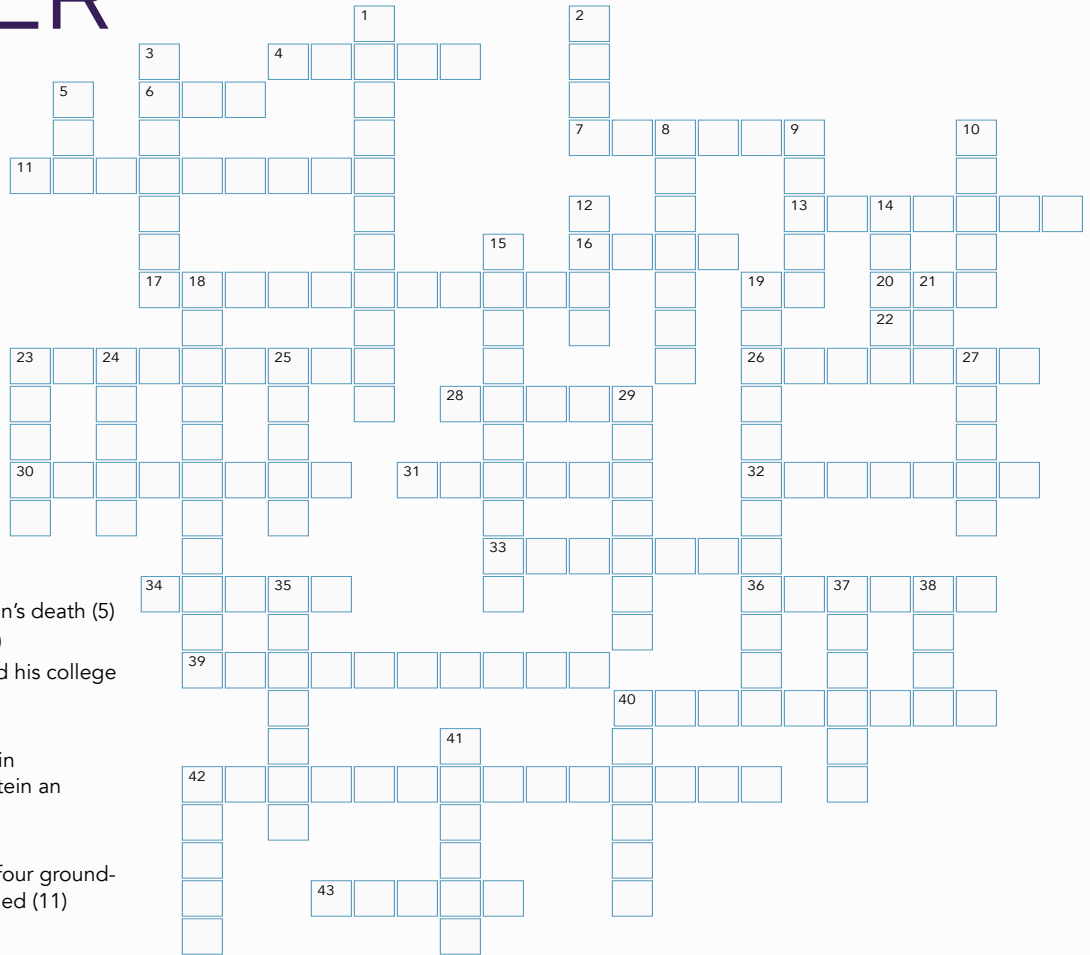
The last book I read—*The Martian*, about survival against all odds—made a great impression on me. It's better than the movie, and I highly recommend it.

What do you miss about Israel, your native country?

Most of my family lives there, and I miss seeing them more frequently, especially during the holidays. And I miss being able to go to the beach almost every weekend. It's like Florida weather there. **E**

ALBERT'S PUZZLER

BY DEIRDRE BRANLEY



Across

- 4 Body part removed after Einstein's death (5)
- 6 City where Einstein was born (3)
- 7 University where Einstein earned his college degree (6)
- 11 Einstein's U.S. home (9)
- 13 The historically black university in Pennsylvania that awarded Einstein an honorary degree (7)
- 16 Einstein's second wife (4)
- 17 1905, when Einstein published four ground-breaking papers, commonly called (11)
- 19 United States, for short (2)
- 20 Goal (3)
- 22 Cubic centimeter, briefly (2)
- 23 "Most people say that it is the intellect which makes a great scientist. They are wrong: it is _____" (9)
- 26 Examine closely (7)
- 28 Of or denoting the hydrocarbon radical C_2H_5 (5)
- 30 "Two things are _____: the universe and human stupidity; and I'm not sure about the universe" (8)
- 31 A warning or proviso (6)
- 32 Einstein called racism America's "worst _____" (7)
- 33 Type of experiment Einstein liked to carry out (7)
- 34 A stem cell's microenvironment (5)
- 36 State a fact (6)
- 39 Awarded to Einstein in 1922 (10)
- 40 U.S. president Einstein warned about nuclear weapons (9)
- 42 In 1933, Einstein attended the premiere of this filmmaker's *City Lights* (14)
- 43 The rise of this group prevented Einstein's return to Germany in 1933 (5)

Down

- 1 The job Einstein held in Bern (11)
- 2 Smaller than a test (4)
- 3 The field of mechanics Einstein worked in (7)
- 5 "You cannot simultaneously prepare for and prevent ____" (3)
- 8 Einstein's philosopher coauthor of manifesto, Bertrand (7)
- 9 Einstein's theories predicted these: black ____ (5)
- 10 Overproduction of immune cells is called a cytokine ____ (5)
- 12 The city where Einstein published his breakthrough papers (4)
- 14 Einstein joined this civil rights group, for short (5)
- 15 Einstein's most famous equation, the theory of ____ (10)
- 18 "_____ is more important than knowledge" (11)
- 19 Einstein became a citizen of this country in 1940 (12)
- 21 Fire and ____ (3)
- 23 Short, microscopic, hairlike vibrating structures (5)
- 24 Up in the air (5)
- 25 "Unthinking respect for authority is the greatest enemy of ____" (5)
- 27 Stop (5)
- 29 Green, leafy vegetable (7)
- 35 Where an organism or population lives (7)
- 37 A general view, examination, or description of someone or something (6)
- 38 Not imaginary (4)
- 40 Fix (6)
- 41 YU president to whom Einstein wrote a letter (6)
- 42 Domain, kingdom, phylum, _____, order (5)



See how well you did at:
[magazine.einstein.yu.edu/
puzzler19](http://magazine.einstein.yu.edu/puzzler19)



MOTIVATIONS

The Front Line of Philanthropy at Einstein and Montefiore



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- 52 Spotlight
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- 61 Class Notes

To learn more, please visit montefiore.org/supportmontefiore and einstein.yu.edu/deans-fund

MOTIVATIONS

A Message from the President of the
Alumni Association Board of Governors:

JANINA R. GALLER, M.D. '72



The road to a medical career is long, as Lagu Androga, M.D. '16, can attest. Born in Sudan, Africa, he escaped to Kenya after civil war broke out in his homeland, lived in a Nairobi slum, and studied in Wales and Connecticut before eventually coming to Einstein and Montefiore. I feel a connection to him because of my own journey: I was born in Sweden to two Holocaust survivors from Poland, attended high school

and college in New Orleans, and came to the Bronx when I matriculated at Einstein. This medical school offered me not only a warm welcome but also academic and research excellence, along with a strong emphasis on humanism and social justice, and it became my lifelong home.

Dr. Androga, whom we profile in this edition of *Motivations*, has found a home here too. And we are not alone. Many people feel this sense of belonging for many reasons. We see it in our Children's Hospital Innovation Lab (CHILZone). Its team members work every day—thanks in large part to two donors who facilitated a corporate gift—to turn customized virtual-reality experiences into pain-management solutions (see page 56). We see it also in the Einstein Student Mental Health Center, which opened in September 2018 to provide students with an on-site hub for mental health services (see page 52). You can read more about these topics in this issue of *Motivations*—or, better yet, visit the Einstein campus and engage with the faculty, students, and programs that make Einstein and Montefiore the world-class academic medical centers they are today.

Whether you're from Sudan, Sweden, or the South Bronx, you came to Einstein because you believe that empathy and humanism are essential parts of being a physician. I encourage you to join me in strengthening the institution that has educated and shaped us, in turn reinforcing the compassion that drew so many of us to the medical profession—and to the vibrancy of the Bronx, an amazing borough tucked into one of the best cities in the world.

With warm regards,

A handwritten signature in cursive script that reads "Janina R. Galler M.D.".

DR. LAGU ANDROGA CLASS OF '16

BY TERESA CARR

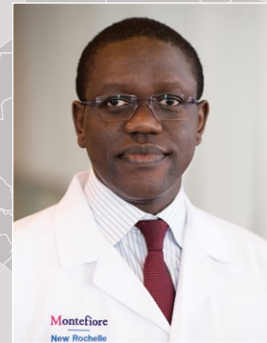
A determination to serve others led him across three continents to Einstein and Montefiore

Dr. Androga's family escaped to the United Nations Kakuma Refugee Camp in Kenya when he was a child. Below, the camp as it looks today.

As he finishes his final year of residency in internal medicine at Montefiore New Rochelle Hospital, Lagu Androga is realizing a childhood dream that began in a refugee camp in Kenya.

"I was sick a lot as a child, always getting malaria and typhoid, and so would frequent the clinics at the refugee camp," Dr. Androga says. He remembers the facilities as rudimentary—one or two doctors in a tent with few resources—but the staff as highly skilled and compassionate. "People loved the doctors," he says. "Parents told their children, 'You can grow up to be a doctor and help your people.' I knew then that's what I wanted to be."

Looking back, Dr. Androga recognizes that time as a gift to both doctor and patient. "We changed each other's lives," he says. "I'm sure those doctors could attest to how the experience enriched their lives. And I'm now caring for others just as they once cared for me." That determination to serve others has led Dr. Androga across three continents to



Einstein and Montefiore.

"The way Lagu has overcome his unique challenges has left an imprint on everyone around him," says Steven M. Safyer, M.D., president and CEO of Montefiore Medicine. The two first met when Dr. Androga was an Einstein medical student. "Lagu doesn't give up. Once he sets his mind to something, he's going to make it happen." That has been true for Dr. Androga his whole life.

ESCAPE FROM A WAR ZONE

Dr. Androga was born in a region of Sudan, Africa, that has since split off into the independent country of South Sudan. By the time he turned 3, his family was caught in the middle of a civil war. His parents' role as educators



Tony Karumba/Afp/Getty Images

MOTIVATIONS | CONTINUED CONNECTION

and his father's outspoken support of human rights put them at odds with the ruling government. "They started arresting intellectuals," Dr. Androga says. "And once you got arrested, you just disappeared." Dr. Androga pauses to draw a breath: "So we started running. There wasn't even time to pack a bag."

It would take the family more than a year to make the harrowing journey south through rebel-controlled areas before they found passage on a United Nations cargo plane that was flying to a refugee camp in nearby Kenya. Dr. Androga describes his shock at the squalor: "It was huge—hundreds of thousands of people crowded together with no infrastructure, living in shelters made of plastic bags." Even worse, he says, "camp personnel treated us like dogs, like we were less than human."

A nun saw great promise in the four Androga children and sponsored their attendance at a public school, which allowed the family to relocate. "The school, in Nairobi, was in the biggest slum in Kenya, but it was known for achieving top marks in national exams," he says. Dr. Androga realized that education would be his only way out. He poured himself into his studies.

DRIVEN TO BE A DOCTOR

In Kenya, medical education starts after high school. Dr. Androga earned the high marks he needed to qualify, but his family couldn't afford the tuition. He politely declined an offer from a nonprofit organization to sponsor a less-expensive course of study, telling the director: "I want to be a doctor; that's all I want to do."

Back in the refugee camp, Dr. Androga was frustrated, but he wrote letters—"to schools, nonprofits,

supermarket chains, any place I could think of, telling them of my hopes and dreams." Eventually he won a scholarship to study at the United World College of the Atlantic in Wales, part of a network of elite boarding schools. Another full scholarship led him to Wesleyan University in Connecticut, where he double-majored in chemistry and molecular biology/biochemistry.

What drew Dr. Androga to Einstein was the college's mission of caring for underserved communities. "As a refugee, I've experienced a lot of discrimination, so the idea that everyone should get good care regardless of who they are or where they come from appeals to me," he says. But he needed to surmount one more barrier to complete his education.

BUILDING CONNECTIONS

An accident with a bamboo stick coupled with poor access to medical care had left Dr. Androga blind in his right eye. That disability didn't limit him until medical school, when he found that his reading speed and subsequent headaches caused serious problems.

Catherine C. Skae, M.D., associate dean for graduate medical education, says she recognized Dr. Androga's determination while arranging for him to have the extra time he needed to take board exams without straining his eyesight. "He's tenacious and works so hard," she says. "It was an honor and privilege to help him."

That hard work has paid off. Dr. Androga received an award for excellence from the Harold and Muriel Block Institute for Clinical and Translational Research and graduated from Einstein with distinction. Recently he passed the last of his three required licensing exams and matched for a nephrology

"As a refugee, I've experienced a lot of discrimination, so the idea that everyone should get good care regardless of who they are or where they come from appeals to me."

— DR. LAGU ANDROGA



Dr. Steven M. Safyer, president and CEO of Montefiore Medicine, with Dr. Lagu Androga on graduation day in May 2016.



fellowship at the Mayo Clinic in Rochester, Minnesota.

He continues to be connected to Einstein through clinical research on chronic kidney disease with Matthew K. Abramowitz, M.D., associate professor of medicine (nephrology). For Dr. Androga, the work is personal: “I was inspired to learn more about nephrology because my mother has kidney disease,” he says. He also instructs the next generation of medical students and has received a Teaching Star commendation for his efforts. (See article, page 6.)

Dr. Androga still maintains his connection to Kenya, returning there to care for his ailing mother. He says he

would like to develop an expertise in global health to help improve health systems in places like South Sudan.

Although their backgrounds are vastly different, Dr. Safyer says that he identifies with Dr. Androga: Both were drawn to Einstein and Montefiore for the same reasons.

“The world would be a better place if everyone had access to healthcare as a fundamental right. That is the ethos that drew me here,” Dr. Safyer says. “Similarly, Lagu worked hard to become a physician as a way of giving back to his community and his country. I know we will stay connected in the future because he is going to do amazing things.” **E**

He also instructs the next generation of medical students and has received a Teaching Star commendation for his efforts.

Dr. Lagu Androga and a student look over a scientific poster in the Forchheimer Building.



MENTAL HEALTH CARE COMES TO THE HEART OF CAMPUS

Einstein's new center makes drop-in visits easier for students

BY TERESA CARR

Just getting into medical school is tough enough. Then classes begin—along with the seemingly endless work. All that can take a toll on students' emotional health.

"Students may think that once they reach medical school, their problems will be behind them, but the statistics show that just isn't true," says Joseph Battaglia, M.D., assistant professor of psychiatry and behavioral sciences. Research suggests that at least one of every four students will develop anxiety, depression, or other mental health issues over the course of his or her training—and that few students take steps to manage their mental health.

To reverse that trend, Einstein has developed a comprehensive mental

health and wellness program for medical and graduate students. At the program's heart is the new Einstein Student Mental Health Center, which opened on the fourth floor of the Van Etten Building last September.

Dr. Battaglia, the new center's director, wants to break down barriers that have traditionally kept students from seeking mental health care. One of the highest hurdles is lack of time; students get so caught up in caring for others that they have few opportunities to attend to their own health and well-being. "Having a clinic conveniently onsite where you can just drop by means students are more likely to come," Dr. Battaglia says. "We've designed the center with student input



From left: Bruce Schwartz, M.D.; Jonathan Alpert, M.D., Ph.D.; Montefiore Medicine CEO Steven M. Safyer, M.D.; Mary Kelly, Ph.D.; Joseph Battaglia, M.D.; Dean Gordon Tomaselli, M.D.; Kristin Williams, Class of 2021; and Allison Ludwig, M.D.

to ensure that it's as easy as possible for them to access care."

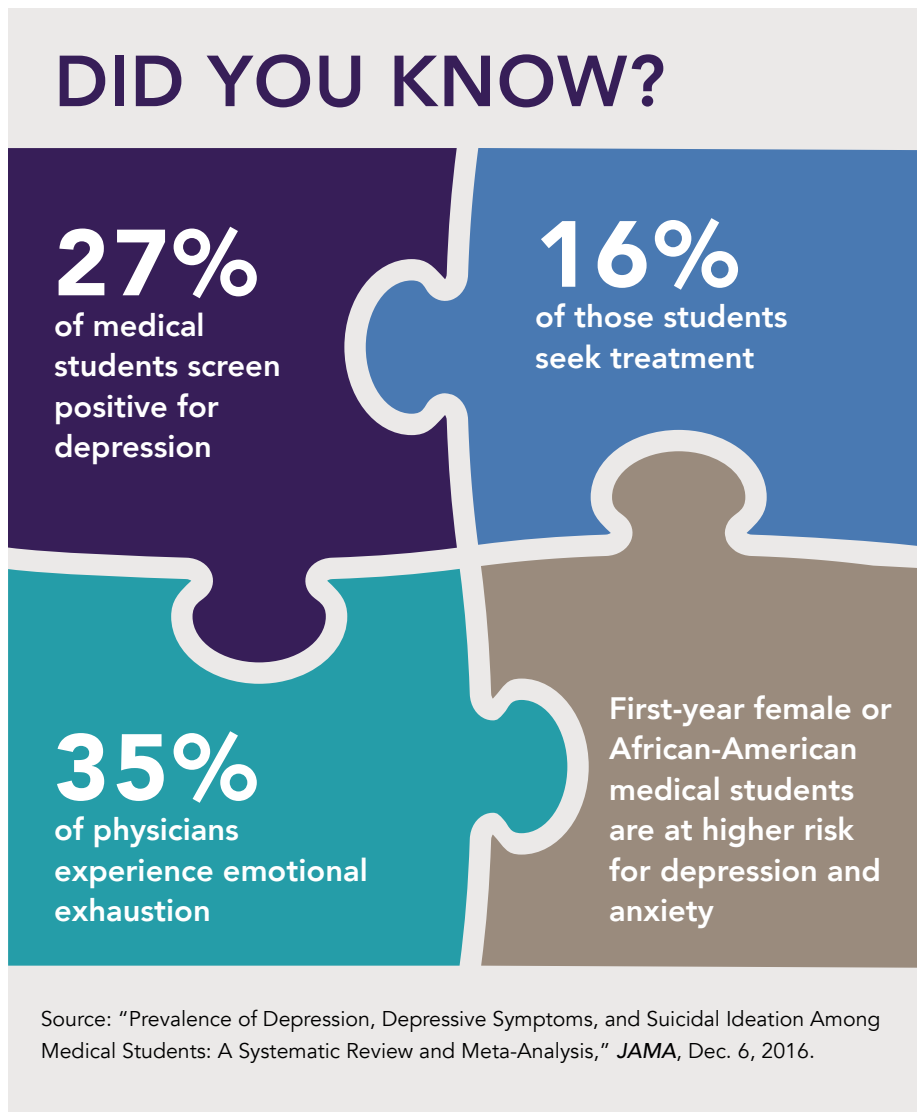
The other major hurdle, Dr. Battaglia says, is the stigma surrounding mental health disorders. "Medical students tend to be stoic and don't want to reveal anything that could be perceived as a weakness," he says. But seeking help, he notes, "is actually a sign of strength."

Einstein Trustee Jay Goldberg agrees. "Opening this center on campus and bringing mental health care into the open is really important," he says. Mr. Goldberg and his wife, Mary Cirillo-Goldberg, say they were inspired to donate to Einstein by the experience of a family member who has mental illness. They found that mental health research and resources were an overlooked aspect of philanthropy. "We're overcoming old-fashioned ideas about mental health to get students the support they need," Mr. Goldberg says.

A CLINICAL ARM

The new center improves on Einstein's existing mental health resources in a key respect—by providing clinical services to students.

"Our WellMed student wellness program and the office of academic support and counseling provide a broad range of activities as well as evaluation and guidance," says Jonathan Alpert, M.D., Ph.D., the Dorothy and Marty Silverman Chair in Psychiatry and chair of the department of psychiatry and behavioral sciences. "But we can now also offer expert clinical evaluation and treatment for which students previously needed to be referred off campus"—a big hurdle for students working long, irregular hours, he says. Plus, many private mental health providers in the community didn't take students' insurance.



"We realized we needed a clinical arm that provides services near where students live and study," Dr. Alpert says.

For convenience, a student can schedule an appointment with a psychiatrist or psychologist by calling the office or using the online calendar. The center takes all types of insurance and has walk-in hours. "If anyone has a concern, we want to make it easy to just stop by," Dr. Battaglia says. He emphasizes that seeking help won't hurt students' professional standing and that all services are confidential.

Students get so caught up in caring for others that they have few opportunities to attend to their own health and well-being.

“Medical students tend to be stoic. But seeking help is actually a sign of strength.”

— DR. JOSEPH BATTAGLIA

Students played a key role in shaping the new mental health center, down to its name. “I fully share their opinion that using words to sanitize mental health care actually perpetuates stigma in a subtle way,” Dr. Alpert says, noting that students objected to less-direct terms such as “wellness” and “behavioral health” when naming the space.

A CULTURE OF EMPATHY

The vision for the Einstein Student Mental Health Center reflects “the growing awareness that student mental health services are vital,” Dr. Alpert says. “If we are going to graduate healthy, well-rounded future physicians and scientists, we need them to recognize the importance of taking good care of their minds and bodies,” he says.

To make that vision a reality, Einstein and Montefiore are seeking philanthropy to cover the operating expenses of the center and endow it.

Mr. Goldberg and Mrs. Cirillo-Goldberg see their investment in mental health as an investment in the future of healthcare. Medical students who learn how to manage stress and get the necessary support will carry that knowledge into their professional lives, becoming more empathetic healers and better role models for patients. “To put it simply, healthier people provide better healthcare,” Mrs. Cirillo-Goldberg says. **E**



PREVENTING PHYSICIAN BURNOUT, STARTING IN MEDICAL SCHOOL

Medical students’ stress and risk of becoming depressed increase significantly over their first three years of training, according to an analysis of yearly surveys of Einstein students published in the journal *BMC Medical Education* in 2015. Lead author Allison Ludwig, M.D., associate dean for student affairs, says that on top of experiencing academic pressure, many students aren’t prepared for the emotional rigors of their clinical years.

“As physicians we are thrust into the middle of people’s suffering. Students will see more darkness in their twenties than most people see in a lifetime,” she says. And for this generation of students, she says, social media can worsen feelings of loneliness and isolation.

Students are particularly vulnerable to mental health issues, says Joseph Battaglia, M.D., director of Einstein’s new Student Mental Health Center. Adolescence through young adulthood is the prime time for anxiety, depression, and other mental health disorders to emerge. “Developmentally, we know that the brain continues to mature well into the late twenties,” he says. Stress can affect brain development, increasing the risk of mental health problems.

The good news is that students can learn to seek help early for issues such as anxiety and depression, which can head off burnout and more-serious problems. “Patients benefit as well,” Dr. Ludwig says. “When everything is harmonious in the hospital, patients feel it.”

MOTIVATIONS | YOUR IMPACT

PEDIATRIC PATIENTS USE
**VIRTUAL
REALITY**

TO FIND REAL COMFORT

BY TERESA CARR AND MANDY WALKER



On some days she hikes deep into the forest, climbing past rushing waterfalls on a carpet of yellow wildflowers as birds chirp overhead. On others she plunges into the ocean, swimming through orange and blue fish as a playful seal tries to get her attention. Chiara Valle, 20, looks forward to these outings—all of them in the Bronx, just down the hall from her hospital room.

These adventures are possible because a virtual-reality (VR) headset transports Chiara to exotic places while she receives chemotherapy for a rare and aggressive cancer called Ewing's sarcoma. Children's Hospital at Montefiore (CHAM) and its Children's Hospital Innovation Lab, also known as the "CHILZone," provide the VR technology. Immersing herself in another space through three-dimensional computer-generated images has helped Chiara deal with months of treatment.

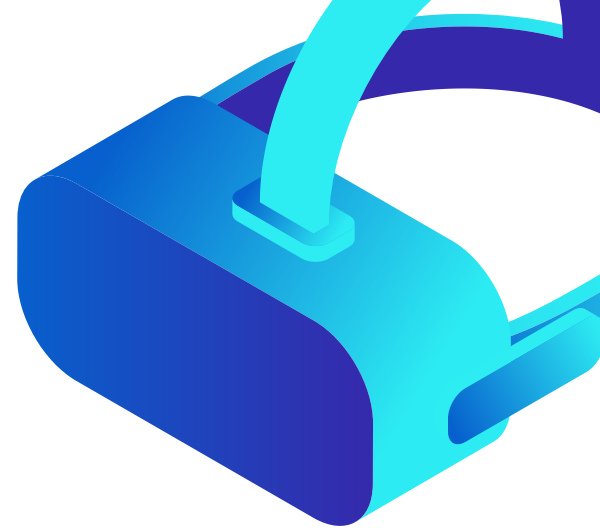
Her favorite VR experience is a

walk among the flowers as she is surrounded by butterflies. "I feel them all around me, fluttering in my face," Chiara says. "They have a special meaning for me since I found out that a yellow butterfly is the symbol of bone cancer," the type of cancer she has.

"Hospitalized children regularly face tests and treatments that are scary or that hurt, so they're naturally anxious about them," says David Loeb, M.D., Ph.D., an associate professor and the chief of the division of pediatric hematology-oncology at CHAM and Einstein. "These digital tools not only help distract them from their illnesses but also ease anxiety and possibly reduce the need for pain medication."

CREATING A MAGICAL WORLD

The CHILZone's director, Olivia Davis, who manages the Fine Art Program and Collection at Montefiore and Einstein, wanted to bring art into the hospital that would engage young people. But initially she was stymied by a space



Immersing themselves in another space through computer-generated images helps hospitalized children deal with months of treatment.

Below left, CHILZone director Olivia Davis watches a patient try out one of the hospital's virtual-reality headsets. Below, Dr. David Loeb.



MOTIVATIONS | YOUR IMPACT

that was cluttered with medical equipment and TVs. Then inspiration struck: “I noticed that people were always on their cell phones or iPads,” she says. “I thought we should meld these worlds in a way that makes sense for healthcare.”

Together with Jodi Moise, director of the Fine Art Program and Collection, Davis came up with a plan that would use the joy and energy of well-known Bronx landmarks. “The majority of digital-media programs—even those aimed at healthcare—are violent or employ generic relaxation techniques,” Ms. Davis says. “Through the CHILZone, we wanted to produce experiences both familiar and thrilling.”

She started by commissioning Tom Christopher, an artist known for his expressionist paintings of New York City, to create virtual paintings of the Bronx’s Grand Concourse at Fordham Road and the Holiday Train Show at

the New York Botanical Garden. “We wanted to use spaces that celebrate the community that the children live in,” Ms. Davis says. “It’s a magical world they can walk around or fly over.”

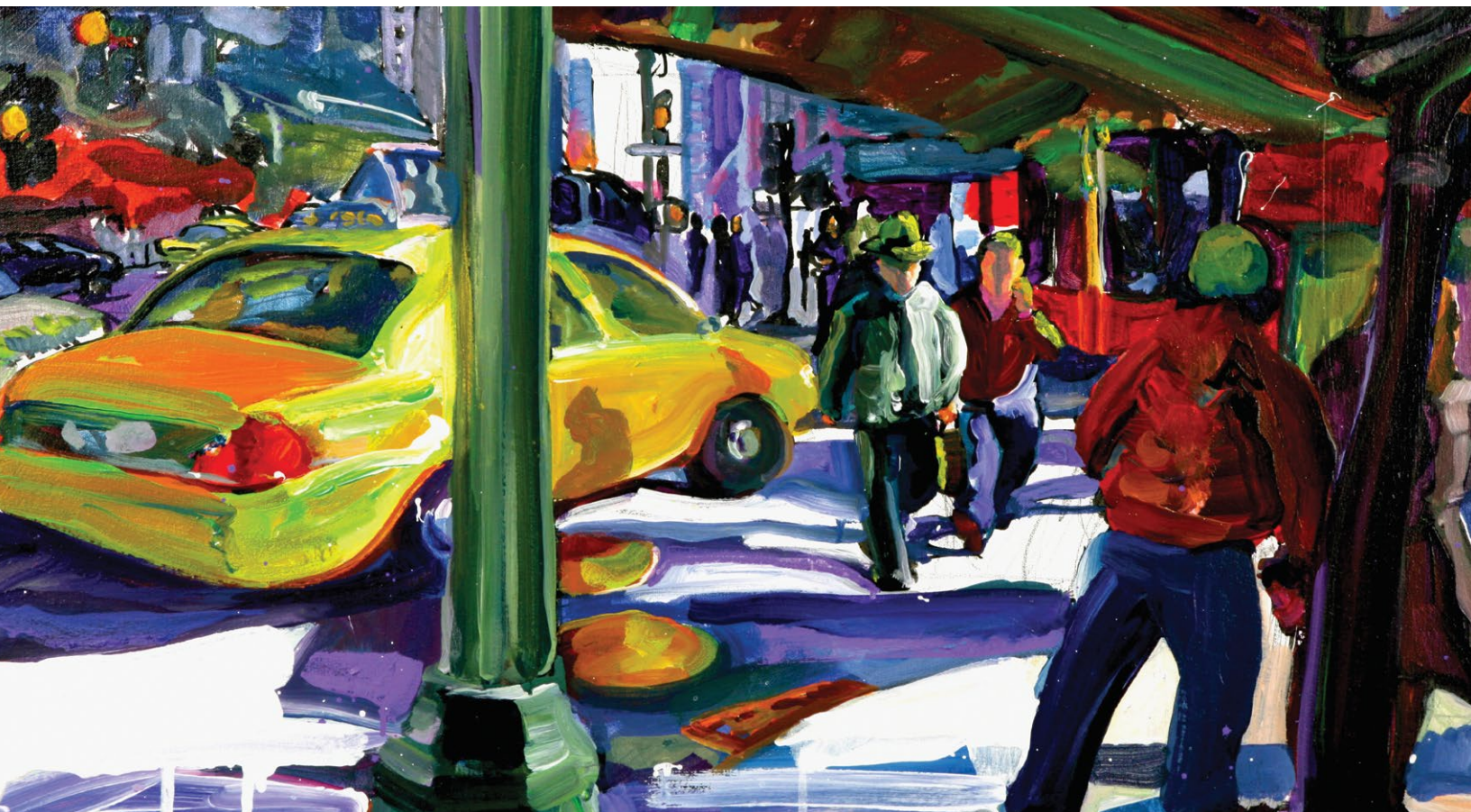
Achieving that vision has required a huge team of collaborators, Ms. Davis says. “There’s a synergy that happens when you bring together diverse talents—information technologists, care teams, clinicians, and therapists at Montefiore and Einstein as well as industry-leading technology consultants, people from academic institutions, and programmers,” she says.

A MORE-INVITING SPACE

So successful was the VR project that Davis and her collaborators brainstormed ways to use another digital technology: augmented reality (AR). Unlike VR, which immerses users in a different world, AR layers virtual

“We wanted to use spaces that celebrate the community that the children live in. It’s a magical world they can walk around or fly over.”

— OLIVIA DAVIS





Above, a child's stuffed animal is photographed so that it can be transformed into a 3-D object that the child can then play with on a tablet. Opposite page, a busy Bronx street scene comes to life when a painting of the Grand Concourse is viewed through virtual-reality goggles.

content onto the real world. The CHILZone collaborators wanted to make the hospital less lonely, dull, and scary by allowing children to interact with digital versions of their favorite toys, animals, and people.

"Kids are often hospitalized for long stretches of time," Dr. Loeb says. "When they are admitted for a bone-marrow transplant, for example, they end up spending about two months with us, in isolation—a tremendous amount of time to be away from their friends and the activities they love."

The CHILZone team devised a solution: the Secret Garden app, which uses AR technology to overlay computer-generated video onto video captured in real time with a smartphone or computer tablet. The result is a completely personalized experience.

"We can take images of a child's pet or stuffed animal and render it as a 3-D object. When she looks through the app, the animal will magically appear at her bedside," Ms. Davis says. "She can play

with it, moving it around and making it large or small." Friends and family members can also send video messages that appear through the app as holograms in the room.

Animals, too, inhabit the Secret Garden, thanks to a developing collaboration with the Bronx Zoo. "The ninth floor of the hospital houses our oncology, sickle-cell, and bone-marrow transplant patients, and will appear as if it's in the zoo," Ms. Davis says. A child moving through the hospital corridor holding a smartphone or tablet might discover a lion sleeping by a door or a giraffe walking around the nurses' station.

DIGITAL-RESEARCH SUPPORT

When David and Arlene Gaynes first heard about the CHILZone, they knew it fit well with their philanthropic vision. The family supports a variety of activities at local hospitals through Chillin' With Adam: The Adam Gaynes Foundation, named in honor of their son, who died of a brain tumor at age 11. The foundation enriches the lives of families with sick kids, providing

HOW VIRTUAL REALITY MAY REDUCE PAIN

Distraction is a time-honored way to cope with pain. If you fall down during a game of touch football, for example, your immersion in the game may anesthetize the pain from a skinned knee. Distraction works for a reason: Focusing your attention elsewhere shuts down some of the circuits carrying pain signals from the point of injury to your brain.

Virtual reality (VR) works the same way with patients. Brains busy processing the sights and sounds of the New York Botanical Garden, for example, are distracted from noticing incoming pain signals.

A growing body of research suggests that VR experiences can make medical procedures much more comfortable for children. For example, a 2018 study of 143 young people ages 10 to 21, published in the *Journal of Pediatric Psychology*, found that those who viewed a VR program while having blood drawn reported significantly less pain and anxiety than those who didn't experience VR. Other studies have shown that VR reduces pain from such procedures as getting flu shots, having burn wounds dressed, and having catheters implanted under the skin.



“We know firsthand how difficult it is for children and their families to spend time in the hospital undergoing treatments for a life-threatening disease.”

— DAVID GAYNES

At top, a patient uses the Secret Garden app on his iPad to make a virtual giraffe and lion magically appear in the hospital hallway. Above, Montefiore and Einstein honored the Gaynes family for their support at the annual Taste of Italy event on Montefiore’s Moses Campus in 2018.

assistance ranging from occupational therapy to family days at a local amusement park.

“We know firsthand how difficult it is for children and their families to spend time in the hospital undergoing treatments for a life-threatening disease,” Mr. Gaynes says. He and his wife were drawn to the CHILZone because of AR’s therapeutic potential and VR’s ability to reduce children’s suffering. “Montefiore and Einstein are really at the leading edge with this technology,” he says. “It struck us as something that could have a tremendous impact.”

Mr. Gaynes supports clinical research based on the innovative VR programs at Montefiore. He helped the CHILZone enter a contest run by the NEX Group, a financial-technology firm. After reviewing 19 entries, NEX narrowed the competition to six, and the CHILZone took home the top prize of \$150,000. That award paid for the staff and equipment for two clinical trials, for which data collection has begun.

“We want to see how different virtual-reality experiences help children

at different ages and with different diagnoses,” Dr. Loeb says.

LOOKING TO THE FUTURE

When the two renovated floors of the pediatric oncology department open this spring, all young cancer patients will have access to headsets and iPads in their hospital rooms as well as in the exam and infusion rooms. The goal is to raise funds to make VR and AR experiences available in all pediatric patient rooms.

The Corporate Art Awards have recognized the CHILZone’s innovative melding of art and technology. And the art magazine *Coda* named a CHILZone entry one of the top 100 design and art projects in the nation.

When Chiara looks ahead, she focuses on adventures “IRL”—in real life. But for now, she’s grateful to slip on the VR goggles and transport herself out of CHAM’s infusion room to another world. “The VR experiences help to ease the nausea I get from my treatments,” she says. “They put me at peace.” **E**

CLASS NOTES

1960s

Morton Schatzman, M.D. '62, has a private practice as a psychiatrist/psychotherapist in London. He is the chair of the board of trustees of the Arbours Association, a charity that offers psychotherapy and places to live to people who might otherwise be in mental hospitals. He and his wife, Vivien, co-founded the association in 1970. He has two sons, Daniel and Gideon, and six grandchildren.

Barbara Barlow, M.D. '63, received a domestic volunteer award in October from the American College of Surgeons' board of governors for work with the Injury Free Coalition for Kids. She founded that initiative based on her work in Harlem to prevent child injury.

Fabius N. Fox, M.D. '63, F.A.C.S., F.A.A.P., retired from his radiology practice specializing in breast imaging in July 2017. He and his wife, Ziporah, spend time with their son Ari, a psychotherapist specializing in helping children with school adjustment; their daughter-in-law, Sharon; their two grandchildren; and their son Danny, who is a Harvard graduate and a jazz pianist. Dr. Fox attended his class's 55th reunion last year.

Morris Stampfer, M.D. '63, is sad to report that his wife of 54 years, Deborah Lewittes Stampfer, died of endometrial cancer in June 2018. He has been working as a noninvasive cardiologist at Jacobi Medical Center since 2006 but is transitioning to part-time status.

Jacob Barie, M.D. '65, retired from interventional radiology four years ago, but is active in educating the public on transgender issues. He and his wife are the grandparents of Jazz Jennings, who is a high-profile transgender advocate. The Learning Channel is featuring their story on the *I Am Jazz* reality series.

Sally Shaywitz, M.D. '66, and her spouse, Bennett, were featured in *The New York Times* on Sept. 21, 2018, in a science article, "The Couple Who Helped Decode Dyslexia."

David H. Abramson, M.D. '69, F.A.C.S., received the "Cure OM Award" from the Melanoma Research Foundation for his work in melanomas of the uvea, the second-most-common location for melanomas in humans.

Laurence J. Marton, M.D. '69, serves on the board of trustees of the American Association for Cancer Research Foundation and on the boards of directors of Cancer Commons, Rapid Science, and the Bay Area American Committee for the Weizmann Institute of Science. In the for-profit sector, he serves on the boards of Cellsonics, Dategra, Matternet, Microsonic Systems, Pathologica, RenovoRx, TOMA Biosciences, and xCures, and chairs the Scientific Advisory Board of PharmaJet.

1970s

Sterling J. Haidt, M.D. '70, retired in January 2015 because of a spinal injury.

Since retiring, he has been creating digital art. His website is www.haidtart.com.

Barry M. Schimmer, M.D. '70, received the Pennsylvania Hospital Department of Medicine's Edward D. Viner Teaching Award for "Outstanding Teacher of the Year" in June 2018. He has been chief of rheumatology for 40 years and is a clinical professor of medicine at the University of Pennsylvania's Perelman School of Medicine.

Jerry Appel, M.D. '72, is still a tenured professor of medicine at Columbia University Medical Center in New York, still married to **Alice Sue Friedman Appel, Ph.D. '75**, still running the Glomerular Kidney Center at Columbia, and still doing research studies, traveling, lecturing, and seeing lots of patients. Their older son, Jacob, is a psychiatrist-ethicist-writer on the Mount Sinai faculty, and their younger son, Seth, practices intellectual property law in Chicago. Their grandkids are 12 and 10.

Walter A. Orenstein, M.D. '72, has been a vaccinologist since 1974, having directed the U.S. Immunization Program for 16 years at the Centers for Disease Control and Prevention. He has co-edited the last five editions of the standard textbook in the field; the last edition of *Plotkin's Vaccines* (7th edition, 2018) won first prize in the public health category at the British Medical Association Awards in 2018. Dr. Orenstein also saw the birth of his third grandchild in September.

MOTIVATIONS | CLASS NOTES

Gary Z. Lotner, M.D. '73, proudly announces the recent birth of his fourth grandchild to his son and daughter-in-law, Drs. Daniel and Monique Lotner. Both are young physicians in Atlanta.

Raymond Reich, M.D. '73, has an active, full-time ophthalmology practice in partnership with his son, Isaac Reich, M.D. In October 2018, the senior Dr. Reich wrote a book in two volumes: *Heaven and Earth: A Real-World View of Jewish Life through the Parashah and the Holidays*. It is available on Amazon.com and Barnes and Noble under Yerucham Reich (Raymond Reich, M.D.).

David Siegel, M.D. '73, recently stepped down as chief of medicine for the VA Northern California Health System and vice chair at the University of California, Davis, after 23 years. He will continue to be an inpatient attending. He and his wife, Nancy, recently welcomed two granddaughters, bringing their total to six. Their son, **Leon Siegel, M.D. '17**, is doing a surgical residency at SUNY Downstate Medical Center, Brooklyn.

Harold Pincus, M.D. '75, received a \$2.4 million grant from the John A. Hartford Foundation to continue the Health and Aging Policy Fellows Program, which he directs. Dr. Pincus is a professor and the vice chair of psychiatry at Columbia University's Vagelos College of Physicians and Surgeons and the co-director of Columbia's Irving Institute for Clinical and Translational Research. He is also a senior scientist at the RAND Corporation.

Karen Lowenstein Kade, M.D. '76, plans to sell her dermatology practice and retire. She will be moving to Venice,

Florida. She has two grandchildren, one from each of her daughters: a 3-year-old boy and a 7-month-old girl. Both families live in the New York City area.

Jesse Goodman, M.D. '77, left leadership positions in government and public health, most recently as chief scientist for the U.S. Food and Drug Administration, and returned to academic medicine/infectious diseases clinical and public health policy work. He finds that Einstein prepared him well and continues to believe that a person can be scientifically sound and humane/socially engaged. He enjoys his three grandbabies, two in Paris and one in Cambridge, who are important antidotes to these challenging times.

Marcia Naveh, M.D. '77, still lives happily in New York City with her husband, Aaron. Their children and three grandchildren are nearby in Brooklyn. After 20 years in primary care, affiliated with Columbia P&S and Roosevelt Hospital, she has become the co-founder and chief medical officer of Matrix Medical Network, a national organization working primarily with Medicare Advantage plans. She continues to enjoy cycling and travel to places such as Patagonia, Mongolia, and India.

Joyce Davis, M.D. '79, has been having fun working with Clairol as a hair and scalp expert on its new Nice'n Easy hair-dye formula. She has been interviewed, photographed, and filmed for stories on this product and hair loss.

1980s

Kenneth J. Davis, M.D. '80, has spent the last 35 years practicing pediatrics in

STAY IN TOUCH

Keep your classmates up to date by submitting your news to *Einstein* magazine. We look forward to including you in our next issue. Email us at alumni@einstein.yu.edu.

Elizabeth, New Jersey. He is now closing his practice to join a pediatric group. All four of the doctors he will work with are people he helped train during his residency. Dr. Davis is still married to Ellen Radin, whom he wed three days after graduation. They have three grown sons who are all doing well.

David S. Friedman, M.D. '80, has been retired for the past four years and is enjoying his nine grandchildren.

Elizabeth H. Rand, M.D. '80, is in Tuscaloosa, Alabama, where she became a tenured full professor and the chair of psychiatry at the branch program of the University of Alabama, Birmingham, which trains medical students and family practice residents. She served as president of the Association for Academic Psychiatry, is a lifetime fellow of the American Psychiatric Association (APA), and has sat on the APA Program Committee for six years. Her photography is on view at www.elizabethhrand.com. She has three married children and four grandchildren.

Walter Szczupak, M.D. '80, closed his pulmonary practice of almost 30 years in 2014 and is working for the 911 Health Monitoring Program of Stony Brook University. He and Anna are the proud parents of Larissa, who works for a New York City law firm; Wolodymyr,



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— Trudy F. Schlachter, Co-President,
Albert Einstein College of Medicine, Women's Division

"Women are making a tremendous difference by funding biomedical research through private philanthropy."

— Terri L. Goldberg, Co-President,
Albert Einstein College of Medicine, Women's Division

WOMEN FUNDING SCIENCE

Leading the way at Albert Einstein College of Medicine (clockwise from left): Trudy Schlachter; Ana Maria Cuervo, M.D., Ph.D., Robert and Renée Belfer Chair for the Study of Neurodegenerative Diseases; Terri Goldberg; and Chinazo O. Cunningham, M.D., M.S., Professor, Department of Medicine

The Women's Division of Albert Einstein College of Medicine in New York City has raised millions of dollars to support world-class science at Einstein. More than 1,000 women strong, we are dedicated to elevating research at every level—from the bench to the bedside—through philanthropy. Our extraordinary volunteers are funding science and truly saving lives.

To learn more, visit einstein.yu.edu/womensdivision or call the office of development at 718.430.2411.



MOTIVATIONS | CLASS NOTES

who graduated from the Massachusetts Institute of Technology and INSEAD (European Institute of Business Administration); and Mikhaylo, who is a third-year ENT resident in Miami. Dr. Szczupak and his wife live in Old Field, New York.

Lei L. Chen, M.D. '83, specialized in medical oncology. She was trained at Memorial Sloan Kettering Cancer Center and served as a faculty member at MD Anderson Cancer Center and at the Huntsman Cancer Institute at the University of Utah. Her research focused on targeted therapy and immunotherapy with a special interest in gastrointestinal stromal tumor. She is now retired and recently moved to Seattle to be close to her two children and three grandkids.

Andrew Blank, M.D. '84, is in private practice with ENT and Allergy Associates in Bayside, Queens. He is a partner in this group of more than 200 ENTs and allergists in New York and New Jersey. His wife, **Dalit Ashany, M.D. '85**, is a rheumatologist at the Hospital for Special Surgery. They have lived in Scarsdale, New York, for 25 years. Their daughter, Nina, married in May 2018 and will be pursuing a dermatology residency at Cornell. Their son, Daniel, is a software developer for Blackstone in Manhattan.

Albert T. Quiery Jr., M.D. '84, and his wife, Donna, relocated to Ann Arbor, Michigan, where he is the medical director for the Rogel Cancer Center at the University of Michigan. He continues to practice hematology and is engaged in courses in bioethics and the social determinants of health. He and Donna are expecting their first grandchild in May.

Simone Kaye Simon, M.D. '89, née Seimon, reports the passing of her father, Dr. Leonard Seimon. He was a professor of orthopaedics and of pediatrics at Montefiore and Einstein and chief of spine and pediatric orthopaedics services. Dr. Seimon was the father-in-law of **David Bruce Simon, M.D., '89**, and the grandfather of **Rachel Beth Simon, Class of 2021**. An outstanding teacher and mentor, he retired in June 2015 after 37 years on the faculty.

1990s

Lam Do, M.D. '92, will captain Team SuperMarrow in the Race Across America—"The World's Toughest Bicycle Ride"—in June. The ride from Oceanside, California, to Annapolis, Maryland, covers 3,000 miles and 170,000 feet in elevation in nine days or less. Support Team SuperMarrow at www.TeamSuperMarrow.org.

Alan Chen, M.D. '93, keeps busy in Illinois as chief of plastic surgery and hand surgery at Silver Cross Hospital, clinical associate for University of Chicago Medicine & Biological Sciences, and assistant professor of surgery at Midwestern University.

Sherry C. Huang, M.D. '94, is looking forward to her 25th reunion. She has been at the University of California, San Diego, since her internship, staying on as a fellow in pediatric gastroenterology and joining the faculty. She now serves as the designated institutional official and associate dean for graduate medical education. She and her husband have a son who plays volleyball at the Massachusetts Institute of Technology and a daughter who is a high school senior.

Hanah Polotsky, M.D. '99, M.B.O.E., B.B.L.S.S., and Alex Polotsky, M.D., M.S. '90, are enjoying life in Denver with their five children (Esti, Avi, Yael, Eli, and Yoshi), ranging in age from 8 to 17. Two children want to follow in their footsteps and attend Einstein. Dr. Alex Polotsky runs a division of reproductive medicine at the University of Colorado, and Dr. Hanah Polotsky oversees a Kaiser Permanente office serving 43,000 patients. Last summer they climbed Mount Kilimanjaro in Tanzania.

2000s

Jacob Levitt, M.D. '00, is the vice chair of dermatology at Mount Sinai Medical Center and the president of the Periodic Paralysis Association. He trains in martial arts and has six rabbits.

Joshua Sisser, M.D. '05, and **Rachel Sisser, M.D. '05**, are pleased to announce the bar mitzvah of their son, Aaron Sisser.

Christina Gagliardo, M.D. '07, was graced with the arrival of a baby boy named Stephen in December 2017. She recently accepted a position as a pediatric infectious disease attending at Goryeb Children's Hospital in Morristown, New Jersey.

2010s

Ali Sharma, Ph.D. '11, serves as a research assistant professor at the Icahn School of Medicine at Mount Sinai.

Esti Hirschhorn, M.D. '16, and Evan Hirschhorn are proud to announce the birth of their son, Yosef. **E**

A LOOK BACK



Checking Out the Library at 60

The three-story D. Samuel Gottesman Library was dedicated 60 years ago—on April 5, 1959—to serve medical students, faculty, and physicians affiliated with Albert Einstein College of Medicine. The library, on the first floor of the Forchheimer Medical Science Building, was built to house more than 200,000 volumes. Construction began in 1957 thanks to a \$500,000 gift from the D. H. and R. H. Gottesman Foundation in memory of pulp and paper industrialist D. Samuel Gottesman. The building included a 180-foot-long glassed-in reading room, reading carrels, study-typing rooms for students, a current periodicals room, and two lower-level floors of stacks for books and journals. In the photo at left, taken the year the library opened, a student in white shirt and tie pores over a textbook. (Note the ashtray on the table.) Sixty years later, technology has changed how students use the same space. First-year student Taneisha Sinclair, at right, uses the library's online portal to connect via laptop computer to the latest biomedical research published anywhere in the world. Her noise-canceling headphones keep her immersed in her work. But just as in 1959, a reference book serves as a helpful study tool. **E**

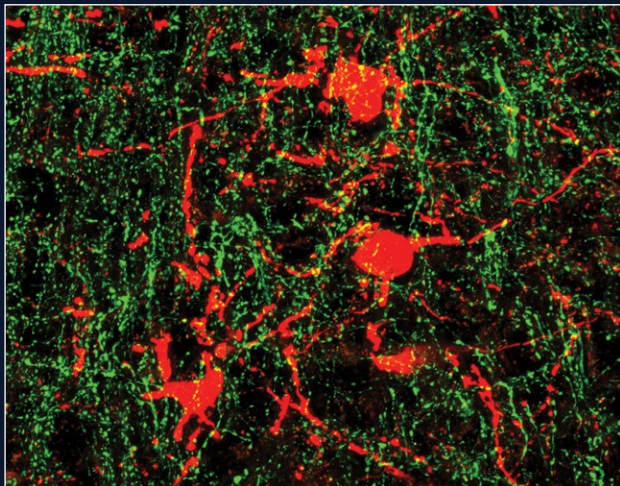
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EINSTEIN IMAGE

In research described on page 38, Kamran Khodakhah, Ph.D., and colleagues identified a new role for the brain's cerebellum, which has long been known for coordinating movement. The researchers discovered that the cerebellum is also involved in reward and social behaviors, thanks to cerebellar neurons that project to the brain's ventral tegmental area. The VTA is crucial for reward processing and contains cells that produce the neurotransmitter dopamine, associated with feelings of euphoria. The image at left shows a section of the VTA from a mouse brain. Stained green are numerous cerebellar axons—long, slender extensions of cerebellar neurons—that have penetrated the VTA. Dr. Khodakhah's team used optogenetics to show that many of those axons connect with and stimulate the VTA's dopamine-producing cells (shown in red).

Image courtesy of Christopher Chen, who completed his Ph.D. in Dr. Khodakhah's lab and is now a postdoctoral student at Harvard Medical School.