

Emory Health *Digest*

AUTUMN 2017

**AIDS.
ALZHEIMER'S.
AUTISM.**

Yerkes is working to
cure what ails you

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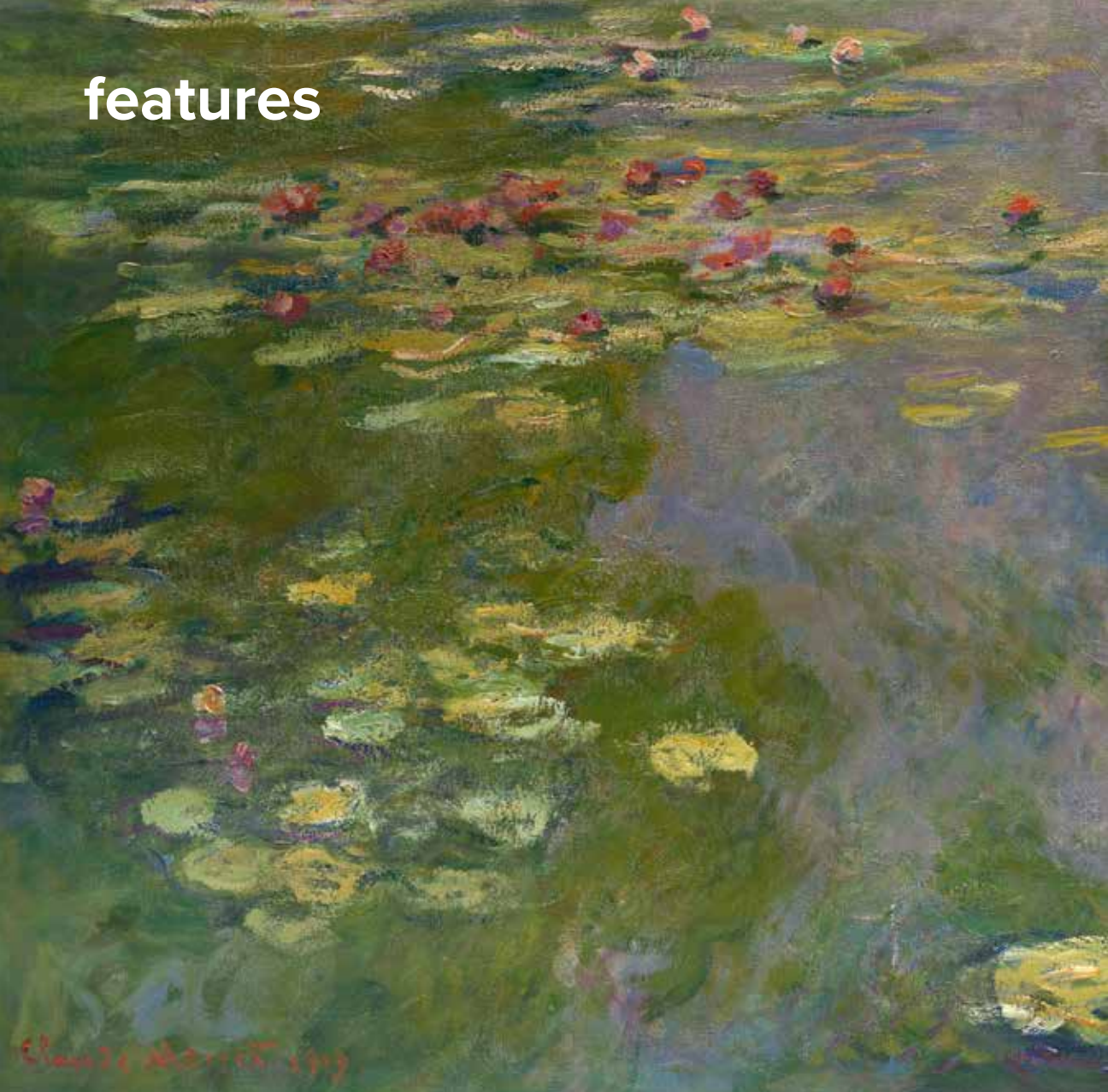
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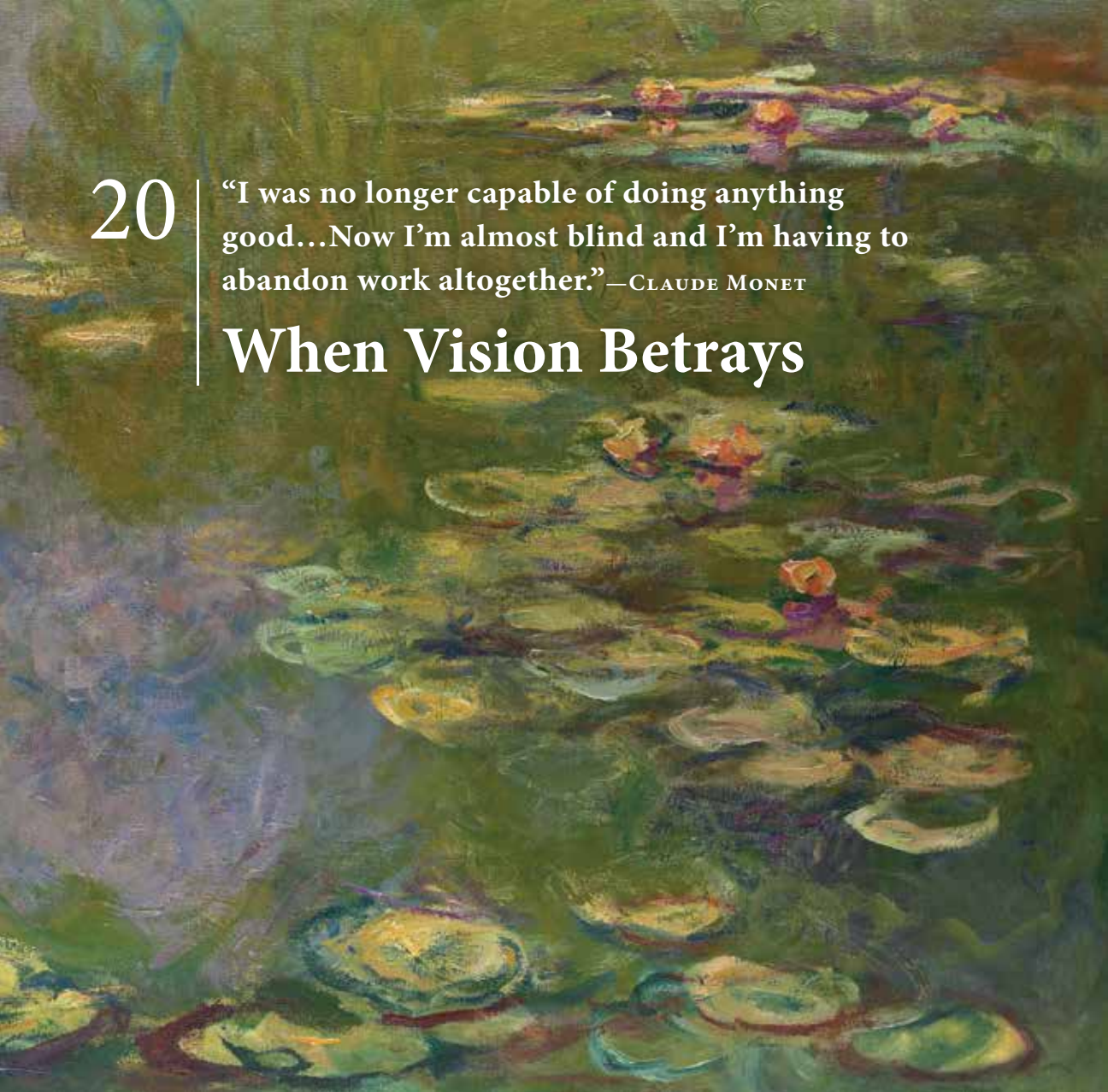
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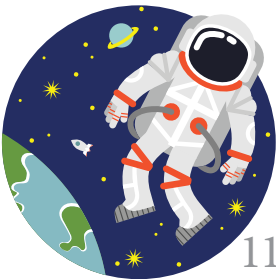
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Drill Day

In preparation for its fall opening, the new Emory University Hospital Tower staged a day of trial runs in departments from admissions to imaging. Here, a “pregnant” mock patient has a fall on the escalator and medical staff respond on the double.



Jonathan Lewin, executive VP for health affairs, executive director of the Woodruff Health Sciences Center, and president, CEO, and board chair of Emory Healthcare.

Welcome to the first *Emory Health Digest*, which is packed full of useful news, promising discoveries, and remarkable patient stories from across the Woodruff Health Sciences Center.

Our cover story spotlights Yerkes National Primate Research Center—one of just seven primate research centers in the country—and how its 90 years of medical research have improved care and saved lives.

With every issue of the *Digest*, we will aim to inform, inspire, and make you say, “I didn’t know that.”

Drop us an email to let us know how we’re doing, and be well.

Jon Lewin
evphafeedback@emory.edu



Jon Lewin @JonLewinMD • Jul 17
We are very excited to bring highly advanced proton therapy treatments to patients in Atlanta, the State, and the entire Southeast!



Jon Lewin @JonLewinMD • Apr 8
Congratulations EUH on being the only Georgia hospital on the Becker list of “100 Great Hospitals”!



Jon Lewin @JonLewinMD • Mar 9
Congratulations to @emoryhealthsci Liver Transplant Program, ranked 2nd nationally and first in Georgia in outcomes!



Emory University @EmoryUniversity • Aug 8
U.S. News & World Report once again ranks Emory University Hospital the No.1 hospital in Georgia emory.link/TMVv0k



Emory Nursing @EmoryNursing • Jul 27
[@EmoryNursing](https://twitter.com/EmoryNursing) has been designated as a Center of Excellence by the National League for Nursing (NLN). twitter.com/EmoryNursing



Emory Public Health @EmoryRollins • Jun 30
Find which clinics near you offer HIV prevention drug PrEP through the #EmoryRollins-developed locator tool. ow.ly/xXcq30dbaC5



the well

Salty, Sour, Bitter, Sweet Success



Super Soy

The next time you go out to eat, you might want to consider sushi with an extra side of soy.

A recent editorial in the journal *Cancer* by Winship Cancer Institute medical oncologist Omer Kucuk suggests that a diet high in soy might be a contributing factor in combating breast cancer.

"We now have evidence that soy foods not only prevent breast cancer but also benefit women who have breast cancer," says Kucuk, an expert in integrative medicine, nutrition, and cancer prevention who has studied soy isoflavones for more than two decades.

Soy has many cancer-fighting properties, including immunologic and anti-inflammatory effects that can ward off cancer or improve the prognosis for current patients.

Chef Scott Adair will never again take his taste buds for granted.

Three years ago, Adair began having trouble breathing and swallowing. He went to a hospital near his Asheville, N.C., home, expecting to get a prescription for antibiotics. Instead he got a devastating diagnosis—tongue cancer. And the news got even worse. The doctors said he needed surgery to remove his jaw bone and his tongue.

"I'm a chef!" says Adair, corporate executive chef of SupHerb Farms. "If I lost my tongue, I'd lose my career."

"I'm a chef!" says Adair, corporate executive chef of SupHerb Farms. "If I lost my tongue, I'd lose my career."

Adair's father had been treated successfully for cancer at Emory's Winship Cancer Institute, so he wasted little time getting to Atlanta—where he grew up and opened his first restaurant—for a second opinion. The drive was well worth it.

Mark El-Deiry, the head and neck surgeon who saw Adair, told him he did not, in fact, need surgery. Instead, he recommended chemotherapy and radiation. However, El-Deiry added that chemotherapy would cause Adair to lose his taste buds for up to a year and they might not come back 100%.

"I was thrilled to not have to have the surgery, but it was still pretty scary to lose my taste buds," says Adair. "I went back to work without all my taste buds, so I just had to rely on my experience."

Adair has made a full recovery. Each type of taste bud came back at a different time. Salt came back first, then sour, then bitter, and finally, sweet.

Not only did his sense of taste make a complete recovery, it came back better than ever. "That may be because I am so much more conscious of my taste now," says Adair. "Before, it was just something I took for granted. But when you lose your ability to taste and then get it back, you are much more aware of each taste, each flavor. Everything is so much more pronounced now." —*Martha McKenzie*

Traveler's Insurance

You're in Denver on business or hiking the Andes of Peru when, boom, it hits you. You've got—ahem, ahem—traveler's diarrhea (TD).

You're not alone. TD is the most predictable of travel ailments, affecting 30% to 70% of travelers annually.

"Everyone is at risk of a foodborne illness, even in the developed world," says Phyllis Kozarsky, a physician at the Emory TravelWell Center and a CDC consultant. "For lack of a better term, traveler's diarrhea is the bread and butter of travel medicine."

Physicians at TravelWell routinely provide pre-travel advice, including how to prevent and treat diarrhea. The tips sound familiar: Wash your hands often. Order cooked foods served steaming hot. Eat fruits and vegetables you can peel. Skip buffet foods that may have sat out for too long. Drink bottled and canned beverages. Pack Imodium or Pepto-Bismol in your suitcase to take at the first sign of TD. If you become ill, drink bottled water or soda to stay hydrated.



OUNCE OF PREVENTION

- 1 **Wash hands often**
- 2 **Order cooked foods**
- 3 **Peel fruits and vegetables**
- 4 **Skip the buffet**
- 5 **Drink bottled water or canned soda**
- 6 **No ice**

TravelWell doctors also prescribe an antibiotic to take along for treating TD. But the rule on when to take it recently changed. Until last year, physicians instructed travelers to take an antibiotic for TD that is mild (tolerable), moderate (distressing or interferes with planned activities), or severe (incapacitating). Now they advise travelers to take an antibiotic only for moderate or severe TD and use Pepto-Bismol or Imodium for mild TD.

The change is included in new TD prevention, management, and treatment guidelines set by the International Society of Travel Medicine, which met at Emory last year. The revision was made to address concerns about antibiotic resistance to bacteria that cause TD. "Antibiotic resistance shows up everywhere in the management of infectious diseases," says Kozarsky. "We now know it's best not to take an antibiotic immediately for traveler's diarrhea, but we still advise people to take an antibiotic with them when they're traveling outside the country."—*Pam Auchmutey*



WHAT'S IN YOUR TRAVEL KIT?

When traveling, TravelWell's Phyllis Kozarsky takes a kit filled with **ibuprofen, acetaminophen, decongestant, anti-itch cream, bandages, and tweezers.** She also carries **Imodium, Pepto-Bismol,** and an **antibiotic.** "I'm susceptible to traveler's diarrhea," she says. "It helps to be prepared, especially in developing countries where medicines may be counterfeit or have ingredients that are less active or contaminated."

A Child's View

What children look at and what they don't—in other words, what captures their attention—is strongly influenced by genetics, found researchers at Emory's School of Medicine, Marcus Autism Center, Children's Healthcare of Atlanta, and Washington University School of Medicine.

"How a child looks at the world is how she learns about the world," says Warren Jones, Nien Distinguished Chair in Autism at Emory and senior author of the study, which was featured in *Nature*. "Each eye movement, happening every half-second, shapes brain development. So you can imagine these effects rippling forward, creating the way a child sees and understands her world." The study examined 338 children—including

82 identical twins (same genetics) and 84 non-identical twins (shared genetics, as with any sibling). Researchers used eye-tracking technology to measure each child's eye movement while they watched videos of childhood scenes.

Identical twins were nearly identical in the way they watched the videos. For non-identical twins, that match fell to about 10%. Identical twins were also more likely to move their eyes at the same time, in the same direction, toward the same location and the same content, mirroring one another's behavior to within 17 milliseconds. When



the twins were tested again more than a year later, identical twins remained almost perfectly matched, but non-identical twins were slightly less matched than before.

Earlier research by members of the team showed that babies who look progressively less at people's eyes are more likely to have autism.

With these new results in twins, the team has found a specific behavior highly influenced by genetics and directly linked to autism risk.

Building a Better Staircase

Flights of stairs are harder to navigate as you age—tough on the knees, not to mention a falling hazard. Current solutions like elevators and chair lifts are costly and difficult to install at home.

So researchers at Emory and Georgia Tech have reimagined stairs themselves, creating stairs that give climbers a boost. "Walking down stairs is like tapping the brakes of your car while revving the engine," says Lena Ting, a professor in the Coulter Department of Biomedical Engineering. "Your legs use a lot of energy bracing each step to avoid falling too fast. Our stairs store that energy rather than wasting it."



The spring-loaded steps reduce force on the ankles while descending, and make climbing easier on the knee. It feels, says team member Yun Seong Song, like walking down a hill with very soft soil. "It's like you have a cushion at every step. You feel low gravity."

Karen Liu, an associate professor in Georgia Tech's School of Interactive Computing, thought of the idea at a conference while considering her own active,

healthy 70-year-old mother's difficulty with stairs.

Bonus: The low-power device can be placed on existing staircases and doesn't have to be permanently installed.

Can You Hear Me Now?

FATHER AND SON GET COCHLEAR IMPLANTS

Thirty-five-year-old Randy Adams and his 16-month-old son, Maxwell, have a bond that most other father-son pairs don't share. They both have genetic defects of the inner ear, leaving Randy nearly deaf and Maxwell completely deaf.

So they are learning how to hear in a different way, together.

Newborn screening identified Maxwell's hearing loss early. At 10 months, he received a cochlear implant—an electronic device that replaces the function of the damaged inner ear. An otolaryngologist, or ENT surgeon, surgically placed electrodes into his inner ear, and he wears an audio processor on his head above his ear to pick up sound. “We make an incision behind the ear and place special electrodes inside the cochlea,” says Esther Vivas, assistant professor of otolaryngology at Emory. “The electrodes send electrical signals to the cells in the inner ear, which are transmitted through the cochlear nerve to the brain.”

After Maxwell's procedure, Adams learned that he, too, might be a candidate for a cochlear implant. “Randy was very motivated for his son to do well, and the thought of being able to experience what Maxwell was going through motivated his decision to also try the cochlear implant,” says Vivas.

Like Adams, more adults are turning to cochlear implants to improve their hearing. In the United States, about 58,000 of the devices have been im-

planted in adults and 38,000 in children.

In early March, Adams had his device implanted at Emory University Hospital Midtown. After a month, the device was activated. Michelle Adams sat beside her husband at the appointment where his device was turned on for the first time.

As with any new technology, specialists must

fine-tune Adams' device, and his brain must learn to make sense of the sounds it is hearing.

“It takes time, and everyone is different in how much benefit they get, and when they get that benefit,” says Jenna Frasso, an Emory audiologist.

Adams has spent the past few months adjusting to and experiencing different sounds. He is able to control the levels of sounds he hears with a remote. He has speech therapy once a week, just like Maxwell, and will return for follow-up programming.

Because Maxwell received his cochlear implant before he turned 1, he should have nearly normal speech development. His dad will likely have more difficulty, however, since his implant came later in life.

“Hopefully, with the cochlear implant, things will improve and we'll find a better career and better job opportunities due to improved hearing,” said Adams, through an interpreter. “There are many things that limit what deaf people are able to do. So, I'm hoping in the future, I'll be able to do more.”—*Janet Christenbury*



“Can you hear me?” she asked.
 “A little bit, but you have a low
 VOICE,” said Randy Adams, in sign language.
 “So good to hear your voice,”
 he added, as Michelle teared up.



An APP a Day...



+ **Quicker BP Calculations** Typically, when nurses take a child's blood pressure, they consult a complex set of tables to determine hypertension risk. The tables require nurses to cross-reference multiple factors—including gender, age, and height—to determine whether a child's blood pressure is normal, pre-hypertensive, or hypertensive. On average, consulting the tables takes up to 10 of the 15 minutes allotted for screening a child.

Pedia BP, a free mobile app developed at the Nell Hodgson Woodruff School of Nursing, simplifies and speeds up the process and provides immediate follow-up guidance for children who need monitoring or treatment. The app works on iOS and Android smartphones and tablets, making it a valuable tool in remote health care settings. Just as important, it allows nurses to spend less time calculating and more time talking to their young patients. So far, more than 10,000 users have downloaded PediaBP.

+ **What Shot Is Due Next?** Can't remember when your child is due for her next DTaP? Want to know the possible side effects of the MMR? Wonder if your child really needs the chickenpox vaccine? The answers to these questions could be in the palm of your hand with ReadyVax. The mobile app contains up-to-date information about vaccines, including the recommended vaccine schedule, descriptions of the diseases prevented, and answers to questions about vaccine safety. Developed by researchers at the Rollins School of Public Health, ReadyVax is available free on iTunes. Messages are tailored for physicians, pharmacists, patients, and parents. With user-friendly navigation and easy-to-understand descriptions, ReadyVax is a reliable resource for learning more about vaccinations and vaccine news—and to consolidate personal vaccine information.



+ **Elvis Would Be Proud** The Anatomy of the Male Pelvis is intended to help doctors and medical trainees better treat patients.

Users can navigate through the male pelvic region, including the bony pelvis, pelvic floor, musculature, vessels, and connective tissue, as well as view the pelvis's relationship to surrounding organs such as the bladder and colon.

Structures can be rotated in 3D, made transparent or invisible, and viewed at different magnifications. The app also allows arteries and nerves that traverse the pelvis to be clicked to trigger identifying text.

Created by Emory's Visual Medical Education team with the Carlos and Davis Center for Surgical Anatomy and Technique, the free app is intended for surgical trainees, medical professionals, and educators, and can be used from the classroom to the operating room.

Countdown to Zero

Guinea worm disease, a scourge so ancient as to be found in Egyptian mummies, is poised to be wiped out.

When it is, it would be the second human disease in history to be eradicated, after smallpox.

People get Guinea worm by drinking contaminated stagnant water, ingesting larvae that become parasitic worms. A worm can grow inside the body for up to a year, reaching a length of two to three feet before it finally emerges through a burning blister. There is no limit to the number of worms someone can acquire. Emerged worms must be gently pulled out, centimeter by excruciating centimeter, which can take up to a month.

Today, due to 30 years of unwavering efforts directed by the Carter Center, there are only a handful of known cases of Guinea worm disease remaining, in one country—Chad. This feat has been accomplished with no treatment, no vaccine, no acquired immunity, and no cure.

The only path to success was to convince deeply traditional people in remote and often conflict-torn regions of the world to change the way they have collected and consumed water for generations.

“Look at how hard it is to convince people in

the United States to quit smoking or eating super-sized meals at McDonald’s,” says Kelly Callahan, one of scores of alumni of the Rollins School of Public Health who have played key roles in the Carter Center’s Guinea worm eradication program.

“Behavior change is hard in the best of circumstances, and with Guinea worm, we’re not dealing with the best of circumstances.”

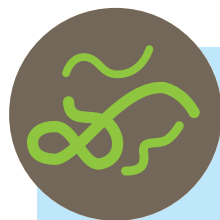
When Carter, a University Distinguished Professor at Emory, publicly disclosed his cancer diagnosis in 2015, he said, “I’d like the last Guinea worm to die before I do.” Now 92 and in remission after treatment at Emory’s Winship Cancer Institute, Carter may just get his wish.

Decades of educating at-risk populations, distributing filters for drinking water, and keeping people with emerging worms out of water sources are on the verge of paying off. But the last mile is always the hardest. “If only three people out of more than 7 billion have a disease, it is hard to galvanize the support needed to stay the course,” says Adam Weiss, another Rollins alum working on the project. “It comes down to keeping up the level of financial and human resources, which we will do. We are not going to give up.”

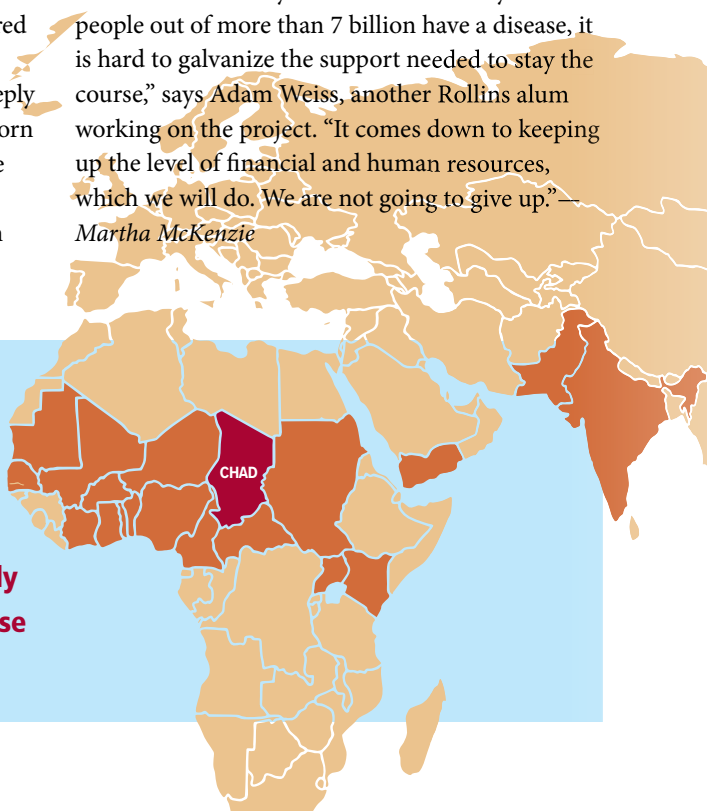
—Martha McKenzie



“I’d like the last Guinea worm to die before I do.”—JIMMY CARTER



In 1986, Guinea worm afflicted an estimated 3.5 million people a year in 21 countries in Africa and Asia. Today, there are only five or six known cases of the disease remaining, in Chad.

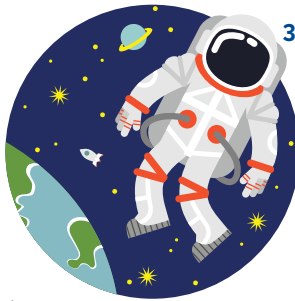


4Q Bodies in Space

C. Ross Ethier, a researcher in the Coulter Department of Biomedical Engineering at Emory and Georgia Tech, answers four questions about astronauts:

1. What happens to the human body in space? On Earth, gravity pulls fluid down to your feet, but in space the fluid goes up toward your head. This reversal of fluid position changes heart function, cardiovascular pressures, eye function, cerebrospinal fluid pressures, lymphatic function, lymphatic pressures, and many other things. Astronauts also lose bone, heart, and muscle mass. My research is on vision impairment and intracranial pressure syndrome.

2. What preventive measures are taken by astronauts to decrease health risks? Drugs are available to counteract loss of bone mass. Astronauts exercise in space to maintain muscle mass. We don't know how to minimize vision loss and that's a big problem.



3. How do scientists simulate conditions that astronauts may experience? There's not an environment on Earth that produces similar conditions and you can't run a clinical trial in space, so conducting experiments on astronaut health is extremely difficult. Scientists rely a lot on computer models to make predictions about how certain treatments will work. We need to develop these models for a wider range of conditions.

4. How did you get interested in astronaut health? NASA became aware that just under half of long-duration astronauts suffer from vision impairment, but couldn't discern who was at risk and who wasn't. The vision problems are believed, in part, to be a result of alterations in fluid pressure—specifically cerebrospinal fluid and how it interacts with the eye. My expertise is in understanding the effects of pressure in the eye, so it was natural for me to become involved with this project.—*Aspen Ono*

From Asthma to Zika

FACING THE HEALTH RISKS OF CLIMATE CHANGE

Climate change is associated with rising sea levels, flooding, and record high temperatures.

It is also linked to a rise in illnesses like heatstroke, asthma, and infectious diseases.

Academic health centers should take the lead in educating others about the health impact of climate change, say health experts in the Global Consortium on Climate and Health Education, which builds on a pledge by 115 medical, nursing, and public health schools

around the world to add climate and health to their curricula.

"We must prepare clinicians for the individual and community health challenges that are emerging at an increased pace," says Emory School of Nursing Dean Linda McCauley, a consortium member. "The health impacts of climate change will touch all of us."

The science linking climate change to human health problems is abundant, says Linda Fried of Columbia's Mailman School of Public Health, where the con-



sortium is based: "It's time to ensure that leaders across all sectors receive the tools necessary to prepare, and are able to translate science into action."

Already, she says, we are seeing longer and more severe heat waves, prolonged allergy seasons, changes in the spread and timing of infectious disease due to new vector patterns, and worsening air quality associated with human-induced climate change—and poor countries carry a disproportionate share of the burden.

Should This Finger Be Saved?



A patient came to Grady Hospital in Atlanta 12 hours after intentionally cutting off his finger.

He did not want it reattached, but a neighbor had called 911 and persuaded him to go to the ER. The patient said he owed a penance to God—a debt paid in full by severing his finger. A psychiatric evaluation showed he was of sound mind in all other aspects of his life and had no intention of further self-harm.

The Emory doctors asked for a consult with the hospital's medical ethicist: **Should the finger be reattached?**

The first inquiry the ethicist made was: Does the patient have the capacity to make his own decisions? If so—and assuming he is fully informed of the consequences—it is his right to refuse medical treatment, even if it is life-saving.

Generally, a person has capacity for a given decision if he (1) understands the situation and the consequences of his decision, and (2) his decision is based on rational reasons. A clear example of someone who lacks deci-

sion-making capacity is a patient with advanced dementia who can't state a preference or follow a conversation.

The team assured the ethicist that the patient was thinking clearly in all regards and understands exactly what he had done as well as the future ramifications of his actions. So the remaining question was: Is the patient's decision rational?

What, exactly, is "rational"? A lot of people do not floss despite clear benefit to their oral health. Given how easy and cheap it is to floss, it seems irrational not to do so. So should nonflossers be deemed incapable of making their own medical decisions? Likely not.

Rational decisions are particularly difficult to assess when a person refuses medical treatment because of religious beliefs. If an adult who is a Jehovah's Witness refuses a life-saving blood transfusion, our medical community is accommodating as long as the patient is fully informed of the risks and has decision-making capacity. But if someone refused

a lifesaving transfusion because they claim to be a member of the Spaghetti Monster Religious Tribe, their decision seems much less rational. Yet, this patient's action also is motivated by a religious belief. Who ought to be the judge of what is rational?

In this case, the patient was determined not to have the capacity to decide because his decision was irrational: It is not a commonly held belief that penance to God ought to be paid in severed fingers.

Despite this, the medical team ultimately decided not to reattach his finger.

Why? The anticipated benefit was too small.

If the patient did not willingly participate in the difficult rehabilitation process, the finger would likely not regain function even if reattached.—*Michael Arenson*



Michael Arenson has a master's in bioethics from Emory and is a current medical student. "You Be the Ethicist" is based on real Emory cases, with some details changed to protect patient identity.



This is my legacy.

Michelle Ludwig O5M O5MPH

Radiation oncologist, assistant professor at Baylor College of Medicine and medical student clerkship director.

Her bequest will support MD/MPH scholarships at Emory School of Medicine and Rollins School of Public Health. As a result of spinal meningitis as a child, Ludwig is profoundly deaf, and Emory helped her overcome obstacles to her medical training and provided scholarship assistance.

“As an oncologist, I have a lot of opportunities to talk about legacy planning and goals of care with patients. The fun part is encouraging them to leave a legacy, and it’s surprising how many people don’t think of it, even though the paperwork is not hard. I give to Emory because it is where I learned to be a creative problem solver and compassionate physician who is comfortable treating underserved populations.”



EMORY

Have you planned your legacy?

giftplanning.emory.edu 404.727.8875



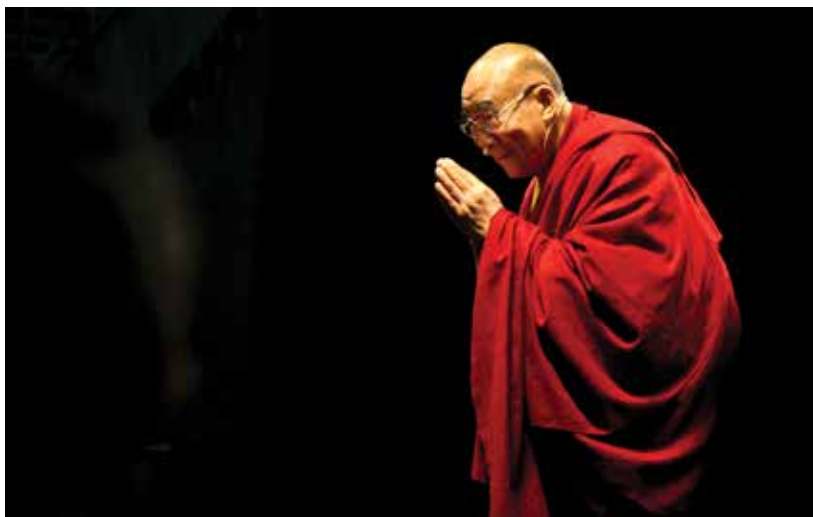
Under an August Sky

Emory University Hospital Tower, which connects to the current hospital with a double-decker bridge across Clifton Road, is now taking patients. Opening fully this fall, it has more than 230 patient beds and will serve as a new home for cancer and transplant care, medical/surgical ICUs, and other diagnostic and treatment services. It even boasts a healthy new eatery—the Clifton Café.



Meditation for Skeptics

By Sanjay Gupta



Sanjay Gupta is associate chief of the neurosurgery service at Grady Hospital, assistant professor of neurosurgery at Emory School of Medicine, and CNN's chief medical correspondent. This essay first appeared on CNN Vital Signs.



AS A NEUROSCIENTIST, I never expected that a Buddhist monk, even the Dalai Lama, would teach me how to better incorporate deduction and critical thinking into my life—but that is what happened.

For the past two months, I have been a changed man. It is hard to fully describe, except to say my mood is mostly sunny and more patient than usual.

In the past, my family and friends would've typically described me as pleasant but hurried. My baseline restlessness and edginess, however, have now nearly vanished.

Without difficulty, I have sustained attention when my young children spend time with me. Instead of constant surveillance of my phone, there is an ability to quickly hyperfocus on the task at hand and a corresponding joy of living in a distraction-less world.

This change seems to have started

the end of last year, after I spent a morning meditating with the Dalai Lama.

First off: Yes, I do feel a little ridiculous writing a line like that, and I didn't feel worthy of his invitation at the time. Even though I meditate, I've never been sure whether I was using proper technique or whether there was an acceptable way to meditate in the presence of His Holiness.

If he was looking forward to a good meditation partner, I worried he was unlikely to find it in me. Even my posture is terrible when sitting cross-legged on the floor. My back starts to hurt, followed by my knees. Thus, my breathing, which is supposed to drive my focus, sounds raspy and uneven. All this makes my mind race instead of slowing down and calming.

Just thinking about meditating with His Holiness was making me anxious.

At 81 years old, the Dalai Lama—

an Emory University presidential distinguished professor who has worked with the university through the Emory-Tibet Partnership and Science Initiative—keeps a very active schedule. I met him in Mundgod, India, at the Drepung Monastery, where he was overseeing a symposium bridging Buddhism and science.

The monastery itself is a dazzling, bejeweled structure built 600 years ago. Inside, there are enormous golden Buddhas standing next to ornate walls. The discussion hall itself is grand but warm, with doors and windows open to the hot South Indian sun.

Nevertheless, who says “no” to a chance to meditate with the Dalai Lama? I agreed to join him early the next morning at his private residence. For three days, His Holiness moderated sessions on weighty metaphysical topics such as the criteria for valid reasoning, the fundamental constituents of the universe, the origins of life, and the subjective experience of the mind.

It was fascinating and mind-bending—but also mentally exhausting. It was difficult to stay awake, let alone keep up with the rapid-fire debate between the Buddhists and the scientists. Yet His Holiness was mentally engaged and inquisitive throughout, even more remarkable given that more than half the comments were being translated for him.

The Dalai Lama typically wakes about 2:40 a.m. and starts his daily meditation routine at 3 a.m., even as most of his staff are still snoozing. This was

the backdrop when one of his senior staff members picked me up outside the monastery early one morning. We drove in a three-car convoy to the gates outside his private residence.

From there, several more staff members escorted us to a small conference room where his security detail was slowly waking and drinking their morning tea. Finally, his chief of staff walked me just outside the personal quarters of the Dalai Lama.

There were a few minor instructions before we entered. Eye contact is not a problem, and shaking

hands is acceptable if you use two hands, not just one. Try not to turn your back to him when leaving the room, and instead walk backward, as much as possible facing him. When sitting cross-legged on the floor, don't point your feet at the Dalai Lama. And the correct address is “Your Holiness.”

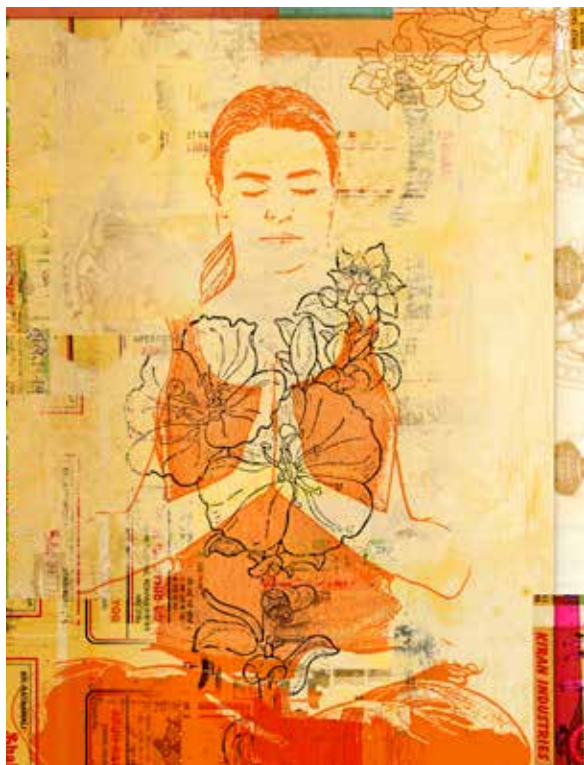
Shortly after, the doors opened, and I nervously walked into a very modest room where the Dalai Lama was sitting on a raised platform, already

deep in meditation. I slipped off my shoes, sat cross-legged at a slight angle on the floor to avoid my toes being pointed in his direction, closed my eyes, and started to focus on my breathing.

All my meditation insecurities immediately started to kick in. After a few minutes, I heard his deep, distinctive baritone voice: “Any questions?”

I looked up and saw his smiling face, starting to break into his characteristic head-bobbing laugh.

“This is hard for me,” I said.



“Me, too!” he exclaimed. “After doing daily for 60 years, it is still hard.”

It was at once surprising and reassuring to hear him say this. The Dalai Lama, Buddhist monk and spiritual leader of Tibet, also has trouble meditating.

“I think you will like analytical meditation,” he told me. Instead of focusing on a chosen object, as in single-point meditation, he suggested I think about a problem I was trying to solve, a topic I may have read about recently, or one of the philosophical areas from the earlier sessions. He wanted me to separate the problem or issue from everything else by placing it in a large, clear bubble. With my eyes closed, I thought of something nagging at me—something I couldn’t quite solve. As I placed the physical embodiment of this problem into the bubble, several things started to happen very naturally.

The problem was now directly in front of me, floating weightlessly. In my mind, I could rotate it, spin it, or flip it upside-down. It was an exercise to develop hyperfocus. Less intuitively, as the bubble

was rising, it was also disentangling itself from any other attachments, such as subjective emotional considerations. I could visualize it, as the problem isolated itself and came into a clear-eyed view. Too often, we allow unrelated emotional factors to blur the elegant and practical solutions right in front of us. It can be dispiriting and frustrating.

Through analytical meditation, His Holiness told me, we can use logic and reason to more clearly identify the question at hand, separate it from irrelevant considerations, erase doubt, and illuminate the answers. It was simple and sensible. Most important, for me, it worked.

I practice analytical meditation every day, usually early in the morning. The first two minutes are still the hardest, as I create my thought bubble and let it float above me. After that, I reach a “flow” state, in which 20 to 30 minutes pass easily.

I’m convinced that even the most ardent skeptic could find success with analytical meditation. After all, it changed me. And I am better for it. **EHD**



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Cultivating Compassion

Meditation is moving into the mainstream. And studies are showing that it may be of benefit to everyone from medical students to at-risk youth.

While empathy and compassion are fundamental to the patient–doctor relationship—and are linked to positive patient outcomes—empathy drops off steeply during medical training.

Emory researchers Jennifer Mascaro, of Family and Preventive Medicine, Andrew Miller, Timmie Professor of Psychiatry and Behavioral Sciences, and colleagues designed a study to see if a specific type of meditation would help.

Cognitively-based Compassion Training (CBCT) uses meditation techniques designed by Lobsang Tenzin Negi of the Emory-Tibet partnership to strengthen resilience and empathy.

The study tested whether 10 weeks of CBCT had a positive impact on a group of second-year Emory medical students. Students who received CBCT reported increased compassion and decreased loneliness and depression, the researchers reported in the *Journal of Positive Psychology*. “The interesting thing is that it had the most impact on students with high levels of depression, suggesting that it reaches those in greatest need,” Mascaro says.

Since 2014, Emory has offered free CBCT courses at the medical school. The course begins with meditative exercises that emphasize self-compassion, then asks participants to expand these emotions to their loved ones, strangers, and others—even those toward whom they do not feel particularly compassionate.

Each class combines didactic teaching and guided meditation.

Meditation courses are proving popular among students, faculty, and staff across the health sciences. On a recent weekday at Rollins School of Public Health, about 50 employees sat quietly on mats (pictured below). The only sounds were the gentle voice of the instructor and peaceful breathing. “It begins with keeping the attention in the present moment—following the breath,” says Timothy Harrison, assistant director of CBCT for the Emory-Tibet Partnership. “Such practices improve our ability to maintain attention on one thing and not have it drawn off by endless distractions.”

At the Nell Hodgson Woodruff School of Nursing, students are learning breathing awareness meditation as well as a type of sensory mindfulness. Several nursing faculty and students are certified in the Community Resiliency Model and



are teaching its techniques to healthcare workers, police, fire-rescue, at-risk youth, and others.

“Participants can immediately use these skills to anchor themselves or to help others,” says clinical research faculty Linda Grabbe. “This type of mindfulness takes advantage of brain neurocircuitry dedicated to empathy, social interaction, and sense of self, and draws on one’s internal resources and strengths.” **EHD**



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When Vision Betrays

Cataracts, Aging, and Creating Art

by *Sidney Perkowitz*

French artist Claude Monet loved capturing the bright, airy beauty of Paris and the Normandy Coast, setting up his easel outdoors and often depicting the same scene again and again as the light shifted and seasons changed. As he aged, however, his paintings began to show a darker color spectrum.

He despaired, writing to a friend, “I was no longer capable of doing anything good...Now I’m almost blind and I’m having to abandon work altogether.”

“I’m working very hard and I would like to paint everything before I cannot see anymore.” —CLAUDE MONET



CLAUDE MONET - DIAGNOSED WITH CATARACTS AT 72

Monet was referring to a widespread malady that affects people of a certain age—the dimming and distortion of vision due to a cataract in one or both eyes.

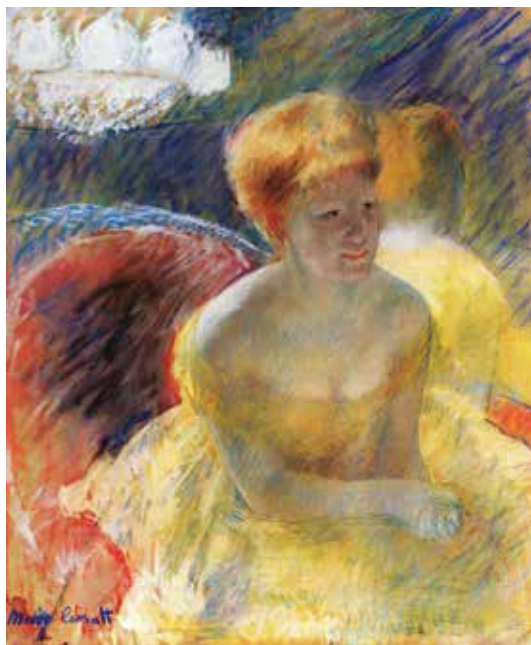
I, like millions of others, recently encountered this in my own life. For many of us these days, this is a curable condition—although it has not always been so.

A cataract is a clouding of the normally clear lens of the eye. This diminishes and scatters the light that would ordinarily pass cleanly through the lens to the retina, generating nerve impulses the brain

interprets as vision. The result is a darkened and blurred view of the world that can turn into blindness if the cataract becomes completely opaque.

Cataracts are most commonly associated with aging, affecting some 17% of people older than 40 and more than half of us by age 80. Cataracts, according to the World Health Organization, are the leading cause of blindness, which is on the increase as people live longer.

Known to medicine long before Monet’s time, the disease’s name has ancient origins: “Cataract” comes from Greek and Latin roots meaning “waterfall”



MARY CASSATT - DIAGNOSED WITH CATARACTS AT 68

or “portcullis,” a vertical grating that closes off an opening when lowered. This most likely alludes to the unclear appearance of the world seen through the cloudy eye, as if one is looking through a curtain of falling water or a screen, but it may also stem from an early belief that cataracts came from fluid traveling down inside the eye.

Modern medicine has shown that the cloudiness actually comes from clusters of proteins within the lens. The biochemical processes that cause cataracts, however, remain a mystery.

We do know that conditions like diabetes make cataracts

“My sight is getting dimmer every day ... I look forward with horror to utter darkness.”—MARY CASSATT



MARY CASSATT

more likely, as does long-term exposure to ultraviolet light (another reason to stay out of the sun—or to wear a good pair of sunglasses!) Researchers are studying these issues, but do not yet know how to reverse the progress of a cataract. Surgical removal remains the only option, as it has been for centuries.

Cataract surgery is one of the oldest known surgical procedures, first documented in a Sanskrit medical compendium at least 2,500 years ago, and in the Western world in a Roman work from 29 C.E. Early procedures were brutally direct. In a method called couching, still used in some countries, a sharp tool was inserted into the eye to cut the

opaque lens free from its supports. The lens would fall to the bottom of the eye, which allowed light to reach the retina. The technique became more refined in 1747, when a French surgeon first removed an entire opaque lens from an eye. This required a relatively large incision, made without benefit of anesthesia. The aftermath was difficult for the patient as well, who had to lie immobilized for days while the wound healed.

Unsurprisingly, these methods often led to complications. And, although light could now reach the retina, it was unfocused, resulting in extreme far-sightedness. To restore a degree of overall good vision, subjects had to wear

enormously thick eyeglasses. The breakthrough needed to make cataract surgery fully successful was to find a way to replace the natural lens.

The answer came from an unexpected source—observations made during WWII by Harold Ridley, an English ophthalmologist. Ridley wrote, “Extraction alone is but half the cure for cataract,” and he sought to make a synthetic replacement lens. But what material to use? It had to be biocompatible so it could reside in the eye for the long term while possessing the correct optical qualities to focus light as needed.

Glass was a possibility. Experience had shown that small

pieces of it could remain inert in the eye for years. But Ridley found a better choice when he examined pilots such as Gordon Cleaver, an English air ace whose “Hurricane” fighter plane had been shot down during the Battle of Britain in 1940. Cleaver bailed out and survived, but his eyes were severely injured by embedded fragments from his shattered cockpit canopy made of the plastic Perspex, or Plexiglas, technically, polymethylmethacrylate (PMMA). After tracking Cleaver’s condition, Ridley concluded that PMMA was biocompatible with the eye and could be formed into a suitable lens at half the weight of glass. He enlisted the plastics industry to make such a lens and in 1949 used his surgical skills to install the first synthetic lens in a patient.

Ridley had invented the intraocular lens, but other ophthalmologists objected to the idea of deliberately putting a foreign object into the eye. Despite intense opposition, Ridley’s lens became widely accepted and saved tens of millions of people from blindness.

It is now standard outpatient procedure to extract the clouded lens and insert a synthetic lens. The type of lens can be chosen for monofocal or bifocal vision and to correct astigmatism. Other advances have reduced the size of the incision for faster healing and fewer complications. Rather than remove the organic, clouded lens in one piece through a large incision, an ultrasound technique breaks it into pieces that are suctioned out through a small opening. Then the surgeon inserts a folded

plastic lens that fits through the small opening and unfolds into its proper shape. Accurate measurements of the eye to determine the new lens parameters and the use of a laser for precise incisions have also contributed to the procedure’s high success rate.

My Emory optometrist, Kenneth Rosengren, told me for several years that my eyes showed beginning cataracts and to watch for signs of their growth. This gradually appeared—not significantly in daylight, but my night vision became dimmer and I saw distractingly bright auras around

streetlamps and car headlights that made it hard to drive in the dark, especially on unfamiliar roads. It was clearly time to get my cataracts fixed.

My Emory surgeon, Maria Aaron, was highly experienced, having performed some 8,000 cataract surgeries over two decades. I chose a monofocal lens to correct my life-long extreme near-sightedness, though not my

middle-aged far-sightedness—I would still have to use reading glasses. I underwent an extensive eye evaluation, was issued eye drops to prepare for the surgery at home, and went in for the operation on my right eye. Then, a month later, my left eye.

Each surgery took about two hours. There was no pain during surgery under local anesthetic or afterward, except for temporary discomfort from eye dryness. An initial sensitivity to light and some cloudiness in my vision soon faded, and I felt fully recovered within a week for each eye. My



CLAUDE MONET



MARY CASSATT



Sidney Perkowitz,
*Charles Howard Candler
Professor of Physics
Emeritus at Emory,
had cataract surgery at
Emory Eye Center. He
has written several books
about scientific and
biomedical topics and
popular culture.*

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vision became noticeably brighter even during the day and my visual acuity tested as excellent, 20/15 and 20/20 in the right and left eye, respectively. My final test has been driving at night, which now feels completely safe.

Operations improved my eyesight while saving me from the worst that cataracts can do. But I learned that, even before reaching that level, cataracts can alter vision in subtle ways.

The human eye and brain can distinguish among some 10 million different colors. Cataracts can severely hamper this remarkable discrimination, as they did for Monet.

After my right eye had been operated on, but while the left still had a cataract, I noticed that my eyes registered colors differently. What looked like a white wall or sheet of paper to my clear eye looked yellow or tan to the other.

Many removed lenses show a yellow or brown tinge, which occurs

in nuclear cataracts that arise in the center of the eye. This tinting reduces the amount of blue light reaching the retina, changing the color spectrum a person senses.

For artists, photographers, and others who need fine visual perception, this distortion of color, along with the other changes, can be devastating.

The stories of Monet, a founder of Impressionism in 1874 and its best-loved practitioner, and his contemporary, the American artist Mary Cassatt, known for her sensitive paintings of mothers and children, vividly illustrate how the treatment of cataracts has changed in the past century.

Cassatt had to give up painting after cataracts seriously affected her vision. Surgical efforts failed, and she died blind in 1926. Her case was complicated by diabetes, which was treated with radium—a radioactive element considered, at the time, a

Ask the Eye Doctors: **Cataracts**

wonder cure, which was used to treat cataracts as well. We now know that exposure to radium can cause cataracts as well as other serious side effects, including cancer and death.

Claude Monet had years of difficulty with his color sense and his general vision due to cataracts, starting in his 60s. Though surgery was recommended, he resisted the idea, partly because Mary Cassatt's surgery had not gone well.

By 1915, at age 75, he found that colors “no longer had the same intensity” and red shades looked muddy. He had to label his tubes of pigment and place paints in a particular order on his palette to make sure he could select what he wanted. He became sensitive to glare and wore a broad-brimmed hat to paint outdoors.

Finally, at 82, Monet agreed to have his right eye operated on. This did not go smoothly. He could barely tolerate lying immobilized between sandbags with bandaged eyes and told his surgeon it was “criminal to have put me in this position.”

But with new eyeglasses, he recovered his artistic vision sufficiently to finish eight mural versions of his famous *Water Lilies* paintings before he died in 1926.

While I don't share Monet's talent, I do have an equal appreciation for regaining my own full palette of colors with which to perceive the beauty of our world. **EHD**

Kenneth Rosengren
optometrist, Emory
Eye Center



Q: Apart from regular eye checkups, what is the most important warning sign of cataract formation?

A: Increased glare at night when driving. A secondary symptom would be a blurring during daytime driving or reading that does not go away.

Q: If someone sees these signs, is immediate surgery necessary?

A: One of the nicer aspects of cataracts is that, even if they have become relatively severe, that does not usually affect the outcome of the surgery. Typically, there is no rush. As long as the patient can do most of what they need to, the surgery can wait.

Maria Aaron
cataract surgeon, Emory
Eye Center



Q: Since you became a surgeon, what advance has contributed most to the success rate of cataract surgery?

A: Advances in phacoemulsification (more efficient use of ultrasound energy) have significantly reduced complication rates, improved efficiency, and shortened recovery time.

Q: Is there a new development in the wings?

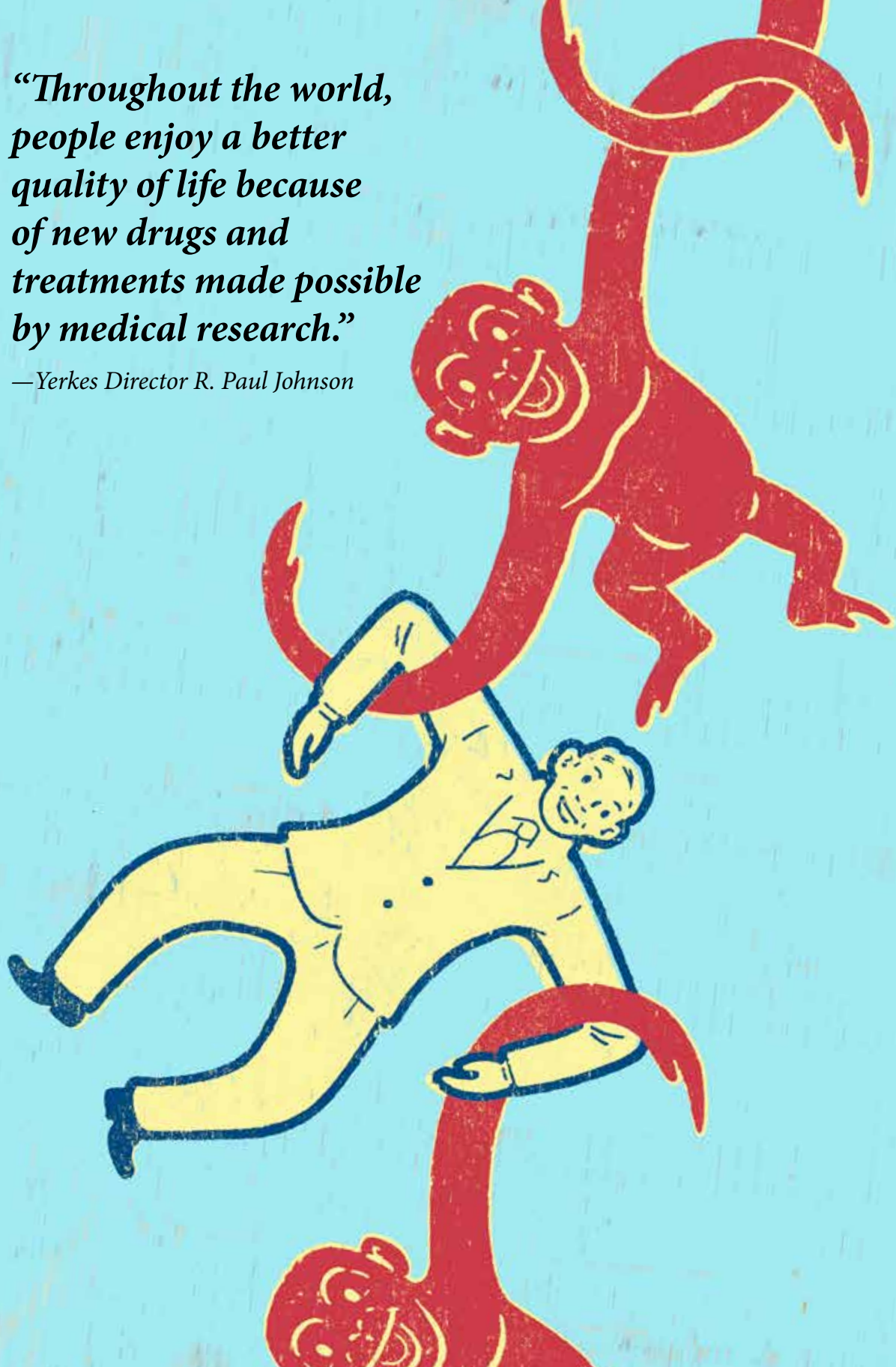
A: Improvement in intraocular lenses (IOLs). The FDA has just approved the new “Symphony” IOL, which has an extended depth of focus and provides good distance vision and also some intermediate and near vision. Early results seem quite promising.

Q: Do you have a surgical ideal you would like to see become a reality?

A: It would be wonderful if we could completely eliminate the need for glasses after cataract surgery. This would likely be achieved with a flexible IOL that could focus at any distance, like a young, normal, and natural lens. It would likely need to be adjusted after surgery with a laser or other “office-based” technique. This will probably not occur in my lifetime but it's fun to dream.

***“Throughout the world,
people enjoy a better
quality of life because
of new drugs and
treatments made possible
by medical research.”***

—Yerkes Director R. Paul Johnson



Yerkes is taking on AIDS, Alzheimer's, and autism—and that's just the beginning of the list

by *Martha McKenzie*

Promising HIV/AIDS vaccines. A test to predict Alzheimer's. Novel treatments for autism. A deeper understanding of social status and its impact on health. Improved anti-rejection drugs for organ recipients. And the list goes on.

As one of seven nonhuman primate research centers in the country, Emory's Yerkes National Primate Research Center brings together a diverse group of scientists—from neuroscientists to immunologists—to work on causes, preventions, treatments, and cures for a host of human diseases. Yerkes researchers also conduct studies to glean a greater understanding of evolution and how humans are linked to their primate cousins.

Established in 1930 by primatologist Robert Yerkes, the center now has more than 3,000 primates, including rhesus macaques, sooty mangabeys, and cynomolgus monkeys, as well as a vivarium with 7,500 rodents, including mice, rats, and voles.

On the following pages, we take a look at the most transformative discoveries and life-saving treatments to have emerged from Yerkes.



R. Paul Johnson, Yerkes director, whose own research centers on HIV and immunity.

OTHER LANDMARK DISCOVERIES FROM YERKES

Identified a way some sooty mangabeys' immune cells resist SIV (the nonhuman primate equivalent of HIV) infection, which **may allow HIV-infected individuals to cope better with infection.**

Achieved sustained remission in SIV infection in rhesus macaques by supplementing antiretroviral drugs with an antibody. This could mean that someone with HIV would not need to take anti-retroviral drugs permanently, and could **help researchers craft more effective vaccines.**

Developed a test in nonhuman primates that uses infrared eye tracking to detect mild cognitive impairment, which could **help predict the onset of Alzheimer's disease.**



HIV/AIDS

Prime Time

HIV has become a life sentence instead of a death sentence, but a vaccine remains out of reach.

"I certainly believe an HIV vaccine is achievable," says microbiologist and immunologist Rama Amara. "We've already made remarkable gains, and this would not have been possible without everything we've learned through our work with the monkeys."

Amara has just received National Institute of Health (NIH) funding to take a vaccine he developed through the first phase of a clinical trial to test its safety. This vaccine builds upon the work of Harriet Robinson, who pioneered a DNA-based vaccine that stimulates an immune response by using only pieces of the virus instead of the virus itself, so the recipient is never placed at risk of infection.

Robinson's original vaccine regimen consists of two inoculations of noninfectious HIV particles to prime the immune response, followed by two inoculations of a weakened smallpox vaccine to boost that response.

The vaccine was effective in preventing the spread of SIV (the monkey version of HIV) in some of the vaccinated animals. Robinson, now an emeritus professor of microbiology and immunology at Emory

School of Medicine, is continuing work on vaccines for HIV, Zika, and other human viruses at the biomedical company GeoVax, where she is chief scientific officer.

Amara's vaccine includes the addition of a protein—CD40 ligand—which was shown to improve protection in monkeys.

Amara's colleague, Cynthia Derdeyn, uses studies of human subjects and nonhuman primate models to develop novel antibody-based vaccination strategies for HIV. Highlights of her recent work include tracking exactly how the crafty virus evades obstacles posed by the immune system. "The goal is to generate antibodies that can attack the virus particle as well as virus-infected cells," says Derdeyn.

A vaccine will come too late for the millions already infected with HIV, so Yerkes researchers are also working to find a cure. HIV is hard to get rid of for many reasons, but one is that even when it is suppressed by antiretroviral drugs, a bit of the virus hides out in reservoirs in special areas of the lymph nodes. Georgia Research Alliance Eminent Scholar Guido Silvestri and colleague Mirko Paiardini are leading studies to find ways to kick the virus out of its hiding places and then kill it with a vaccine and/or drugs.

Autism

Chemical Bonds

Call it "vole love."

Larry Young has been trying to discover what makes humans able to establish relationships by studying two species of these small rodents.

Prairie voles are monogamous,



forming bonds that last their entire short lives. Their close cousins, meadow voles, are promiscuous.

Through decades of research, Young has been able to tease out the brain chemistry and circuitry that underlies the prairie voles' ability to form and maintain relationships.

Because relationships are not easy for people with autism, Young thinks his discoveries may lead to better understanding and treatments for the disorder. "In people with autism, social information does not activate the reward center of the brain as it does for the rest of us, so in their minds, social information is no more important than any other type of information," Young says.

This makes it hard for them to infer emotion, remember faces, feel empathy—things that are necessary to form strong social bonds.

"We know the brain chemistry and circuitry behind these abilities," he says, "so now we are trying to find ways to tweak the system in those with autism."

Some of the more promising work revolves around the hormone oxytocin (not to be confused with the synthetic opiate oxycontin), which is the magic ingredient behind the strong maternal bond as well as the glue between lovers. It also sharpens the brain's attention to social cues. Prairie voles' brain reward centers are

highly sensitive to oxytocin—their meadow cousins, not so much.

If you could boost oxytocin uptake in those with autism, they might become more aware of social cues. The problem is that only a tiny amount of synthetic oxytocin is able to make it past the blood-brain barrier into the brain.

Young has found a new drug that stimulates the natural release of oxytocin in voles, inducing them to form a pair bond even without mating. He is testing it in humans in an Australian clinical trial. "I don't think giving a child oxytocin and sending him off to school would be the best approach," says Young. "A person who has autism is likely to get as many negative social cues in a day as he does positive ones. Making him more attentive to those could be damaging."

However, says Young, boosting social learning in therapy could make the sessions more productive.

Oxytocin is just one of the avenues he is pursuing with voles: "By understanding the neurochemistry involved in social engagement, we hope to find novel ideas for improving social functioning in those with social deficits."

Antirejection drugs Transplant Solutions

Sometimes, the cure can be nearly as problematic as the cause.

Until six years ago, the best drugs available to prevent organ rejection after a kidney transplant were members of the cyclosporine family (CNIs)—which are actually toxic to the kidney. The drugs, which must be taken for the rest of a patient's life,

Developed a new class of drugs, phenyltropanes, which are being **tested as a treatment for cocaine addiction.**

Learned that chimpanzees recognize faces as well as people do, **shedding light on the link between human and nonhuman primates.**

Identified blood-based biomarkers in patients with active tuberculosis that could lead to **new diagnostics and tools for monitoring TB treatment response and cure.**

Transformed an antisocial mouse into a more social animal by genetically manipulating the distribution of a specific receptor in the brain, offering **promise in treating social disorders like autism.**

Found plaques and tangles in the brain of a 41-year-old primate that died from stroke, which may lead to **advances in treating Alzheimer's.**

Determined repeated exposure to anesthesia early in life causes alterations in emotional behavior that may persist, **informing medical teams of this risk.**

Discovered specific receptors as targets for the development of **new treatments and therapies for Parkinson's disease.**

Used antibodies to promote long-term acceptance of transplanted organs in mice without immunosuppressive medicine, offering **promise for organ transplant patients.**



also trigger a host of ills, including high blood pressure, elevated cholesterol, and diabetes. On average, a kidney recipient on cyclosporine can expect to live eight to 10 years after the transplant without another transplant.

The game changed in 2011, when the Food and Drug Administration approved belatacept, which, unlike CNIs, selectively targets the immune system and prevents rejection without damaging the kidneys or increasing cardiovascular risk.

FDA approval was the finish line of a journey that began in the 1990s at Emory and Yerkes. Transplant surgeons Christian Larsen and Thomas Pearson worked first with rats and then with monkeys on development of the breakthrough drug. “In our clinical practice we saw how transplantation could transform lives, but at the same time we saw how the very drugs that we were using to prevent rejection ultimately caused the transplants to fail prematurely,” says Larsen. “We were extremely fortunate to be undertaking our studies at Emory, where we could move seamlessly from the lab to Yerkes and then to clinical trials, saving years in the development program.”

Belatacept has not yet deposed CNIs as the gold standard for kidney transplant patients. About 3,000 people in the U.S., including nearly

1,000 at Emory, are on the drug. That is likely to change after a report in the *New England Journal of Medicine* showed that seven years after transplant surgery, patients on belatacept were 43% less likely to die of organ rejection than those who took cyclosporine. And the kidneys of the belatacept patients functioned as well in year seven as they did in year one.

“This is a really big step toward having one transplant last for a lifetime, which has been sadly far from the case for the majority of people,” says Larsen. “We’ve got work to do but belatacept also holds promise for use in transplants of other organs, such as hearts and lungs.”



Social intelligence **Share and Share Alike**

Empathy, fairness, and a sense of morality have long been considered uniquely human traits.

Then primatologist Frans de Waal shook perceptions with his research uncovering similar attributes in monkeys and apes. De Waal spent his career studying behavior and social intelligence in primates.

When de Waal first began doing research in the 1970s, ascribing human characteristics such as intentions or emotions to animals was akin to blasphemy. But early on the young scientist observed chimps

reconciling and offering comfort after fights, and he became convinced monkeys, apes, and humans shared the ability to understand and respond to others' feelings.

De Waal devoted his career to uncovering the "humanity" in monkeys and apes. His most famous study—an experiment demonstrating that monkeys possess a sense of fairness—came about by accident.

"At that time, scientists considered a sense of fairness a moral principle derived through reasoning and logic," he says. "Because I was studying emotional intelligence, not cognitive intelligence, I was not looking at fairness. My experiment was investigating cooperation in capuchin monkeys."

During the course of that study, however, de Waal noticed that the monkeys paid keen attention to the reward the other monkey was getting.

"If everyone got the same reward for a certain task, they were fine with that and would keep doing the task," he says. "But if one monkey noticed the other one got something better than he did—for example, a grape instead of a cucumber—he would stop doing the task and become upset."

Together with Sarah Brosnan, now a professor at Georgia State University, de Waal replicated the study several times and discovered that chimpanzees took it a step further. When given a choice between getting most of the treats for themselves, or dividing them equally with another chimp, they most often chose the latter.

"We have now reached the point that if you asked me what is the dif-

ference between the sense of fairness in humans and in chimpanzee, I would have to say not much," says de Waal. (Yerkes is evaluating donation opportunities for its chimpanzees after the great apes were granted protection under the Endangered Species Act and the NIH moved away from funding behavioral research with them.)



Immune system

Rich Monkey, Poor Monkey

The richest Americans can expect to live more than a decade longer than the poorest.

It's not hard to point the blame—the poor lack adequate access to health care, they are more prone to obesity and tobacco use, and they tend to live in areas more affected by violence and illicit drug use. But it turns out, even if you can factor out all those negatives, poor people may still have a shorter life expectancy. That's because the stress of living on the low rungs of the social ladder sabotages the immune system.

The good news, according to research done at Yerkes in collaboration with Duke and the University of Montreal, is the damage does not have to be permanent. Moving up a rung or two on the social ladder can improve immune function.

Mark Wilson and colleagues

Developed a non-invasive method to image SIV replication in real-time, giving researchers a valuable tool in identifying viral reservoirs of HIV in humans, **potentially leading to a cure for HIV/AIDS.**

Identified chimpanzees' contagious yawning as a sign of social connection between the animals, which is helping researchers **better understand empathy in chimpanzees and humans.**

Found a single gene that is responsible for making promiscuous male meadow voles monogamous, offering **potential insight into human relationships and social bonding.**

Identified the first animal model of AIDS-related dementia, offering **insight for treatment in humans.**

Discovered that a type of stem cell—dental pulp stem cells—can stimulate growth of several types of neural cells, offering **promise for new therapies associated with the central nervous system.**

Discovered that patterns of gene expression are important for predicting flu vaccine immunity in the young and the elderly, **advancing the science of flu vaccine effectiveness.**

Discovered that the strength of the immune response very early in the course of HIV infection **predicts whether HIV eventually will invade the brain.**

Found that intestinal inflammation in mice improves on a diet low in amino acids, suggesting **a low-protein diet could be helpful for patients with Crohn's disease or ulcerative colitis.**

discovered the regenerative power of improved social standing by studying female rhesus monkeys, which live in groups organized by a strict social hierarchy both in the wild and in their captive groups at the Yerkes field station in Lawrenceville.

The dominant females have a life of privilege—eating when they want, sitting wherever they want, getting frequent grooming, and picking on subordinates whenever the mood strikes. Females with low rank, on the other hand, eat when the feeding station is available, give up their spot if a dominant female wants it, go without grooming, and endure constant harassment.

“Life can be hard on the lowest rungs of the ladder,” says Wilson. “Our data show that these monkeys experience chronic unresolved psychosocial stress. We wanted to look at the consequences of that stress and at possible interventions.”

Wilson and the team put unrelated females that didn't know each other into new social groups, introducing them one by one. The females quickly established a pecking order based on seniority.

The researchers then looked at the monkeys' blood. They found genes within immune cells were turned on or off depending on the female's rank, especially within specific types of white blood cells that act as the first line of defense against infection.

In low-ranking monkeys, genes were expressed in a way that caused the white blood cells to go haywire, overexciting the immune system and leading to chronic inflammation which, in turn, left the animals more

vulnerable to infection and disease. The genes in high-ranking females, by contrast, were expressed in a way that boosted immune response.

Then, like an episode of *Survivor*, the monkeys were sorted into new groups and had to establish new hierarchies. Positions changed. Some formerly dominant monkeys were now low in social standing and others moved up the ranks. Remarkably, the monkeys' immune cell regulation changed according to their new rank. Immune response improved in monkeys who rose in social standing and decreased in those who fell.

“This shows that we need to move beyond looking for pharmaceutical solutions to treating the harmful effects of chronic stress,” Wilson says. “We need to give people the resources necessary to either remove the stress from their lives or to develop coping strategies to deal with it.”



Genes Monkeying around with genes

Huntington's disease has been likened to having Alzheimer's, Parkinson's, and ALS all at the same time.

Scientists know the cause—a mutation in a single gene—but have not been able to come up with a treatment or cure.

Rodent models of Huntington's,

as well as other neurodegenerative disorders, have not proven to be very helpful—rodents with Huntington’s don’t develop all the same physical symptoms and their cognitive decline and mood swings can be hard to gauge. In a major breakthrough, Anthony Chan developed the first transgenic monkey model of Huntington’s. Transgenic animals have a foreign gene deliberately inserted into their genome. Chan’s research team at Yerkes injected the mutant gene responsible for Huntington’s into mature eggs collected from rhesus macaques. The team then fertilized the eggs in the lab and implanted the embryos into surrogate monkeys.

Chan has followed these monkeys

with Huntington’s from birth to 10 years, and found that they developed symptoms similar to humans with the disease.

Between 2 and 5 years of age, the monkeys exhibited increasing symptoms of Huntington’s. MRI scans also revealed changes in their brains similar to those in humans.

Now, his team is expanding the colony with the aim of testing different treatments.

“The work we do with these monkeys will be very translatable to humans,” says Chan. “These monkeys will now allow us to evaluate new treatments, such as gene therapy, faster and get them to patients sooner.” **EHD**

Identified unique brain mechanisms involved in mother-infant interactions, providing **insights into diseases like autism and schizophrenia.**

Explained why vaccines designed to protect against HIV can actually lead to increased rates of infection, **illuminating the “backfire effect.”**

Determined that neurochemical changes in the brain associated with cocaine use also can be triggered by environmental stimuli, creating **new treatment paths for addiction.**

Discovered that the length of seemingly non-functional DNA, known as **“junk DNA,” may shape social behavior.**

To support

Yerkes researchers who are improving human health and lives worldwide, contact **Vicki Riedel at 404.778.5939 or vriedel@emory.edu**

Who’s who



Rama Amara and Harriet Robinson developed an AIDS vaccine now in human trials.



Anthony Chan created the first transgenic monkey model of Huntington’s disease.



Frans deWaal has advanced the understanding of emotions such as empathy and altruism.



Larry Young illuminated the brain chemistry of social relationships and bonding by studying voles.



Chris Larsen and Thomas Pearson codeveloped a new immunosuppressant, belatacept, for transplant patients, which prevents rejection without damaging the kidneys or increasing cardiovascular risk.



Cynthia Derdeyn develops novel antibody-based vaccination strategies for HIV.



Mark Wilson discovered the regenerative power of improved social standing.

Caring for Mary



Lloyd McCreary, 66, wakes up every morning thinking about his wife, Mary. He visits her daily for breakfast and lunch at Montclair, the personal-care facility where she has lived comfortably going on two years.

Moving Mary there was painfully hard for Lloyd, who cared for her at home for several years after an Emory neurologist diagnosed her with early-onset Alzheimer's disease at age 56.

But as her coordination declined, he feared that she would hurt herself from a fall.

He decided on Montclair with the help of friends from his support group as well as social worker Laura Medders at Emory's Integrated Memory Care Clinic, where Mary was a patient.

"I put off assisted living because I didn't think it would be necessary until Mary no longer recognized me, or became agitated, or began to wander," Lloyd says. "None of these things had happened, but I had not anticipated her relatively young body betraying her."

Open since 2016, the Integrated Memory Care Clinic has become a model of care for patients like Mary. It is the first clinic in the nation specializing in primary care for dementia patients and the first nurse-led "medical home" at Emory Healthcare.

Medical homes are not places where patients live, but clinics that streamline care for patients and their families. A provider team (nurses, physicians, social workers, and others) provides primary care and coordinates appointments with specialists. Their

by Pam Auchmutey

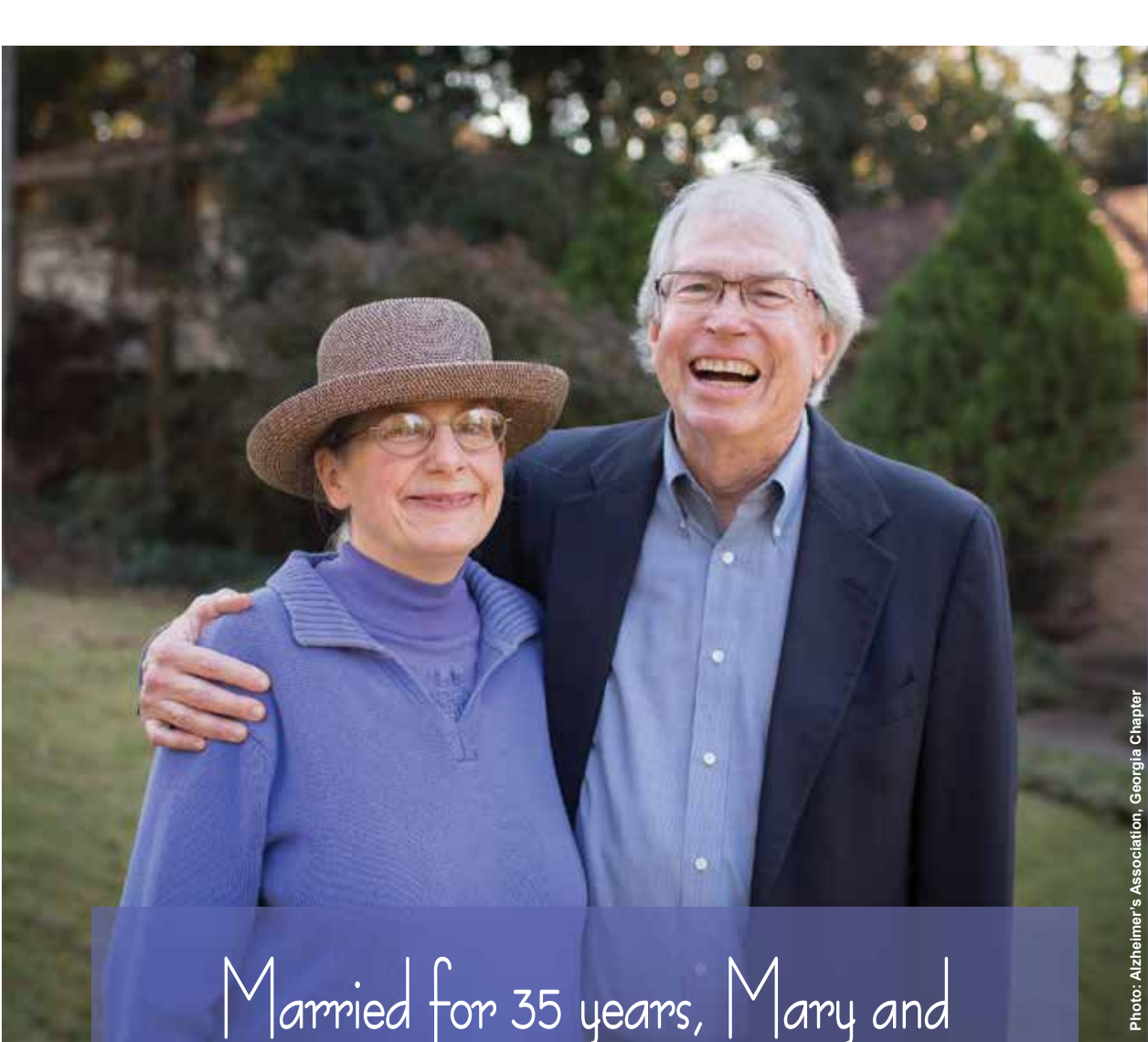


Photo: Alzheimer's Association, Georgia Chapter

Married for 35 years, Mary and Lloyd McCreary raised a son, enjoyed careers in accounting, and weathered life's storms together. Then Mary was diagnosed with early-onset Alzheimer's.

goal: to improve health outcomes and reduce ER visits and hospitalizations.

At the Integrated Memory Care Clinic, patients with dementia receive care for coexisting illnesses such as hypertension or diabetes, and minor illnesses and injuries. Patients are seen by nurse practitioners (NPs) trained in primary care, palliative care, and geriatrics. A patient care coordinator, a social worker, and supervising physicians in neurology and geriatrics are also on staff. In addition to medical care, the clinic offers support and training for caregivers and advanced care planning for patients and families.

Day or night, NPs are available by phone to help caregivers manage minor problems and save a trip to the clinic or emergency room. When a trip to the clinic is warranted, patients are seen within 24 hours. "I'm a huge fan," says Lloyd. "They provided much-needed support as well as valuable information about what I should expect."

Carolyn Clevenger, a faculty member at Nell Hodgson Woodruff School of Nursing, and colleague Janet Cellar at Emory Alzheimer's Disease Research Center came up with the idea for the clinic based on feedback from families like the McCrearys, who were juggling appointments with different providers and struggling to determine which diagnostics and treatments were needed.

"We're here to help patients and families understand how



Lloyd and Mary, who met when she was in college at Florida State University, married in 1981 at a Methodist chapel in Tallahassee.



Lloyd and their son, Edward, visit with Mary at the Montclair personal-care facility. She was diagnosed with early-onset Alzheimer's disease in 2010 at age 56. Watching his wife's gradual decline has been difficult. "I miss conversing with her the most," Lloyd says.



Ann Borden

The nurse-led care team meets to discuss cases to help streamline patient care, coordinate doctors' and specialists' appointments, and minimize trips to the ER.

dementia works," Clevenger says. "We're here to help them manage a urinary tract infection or a sudden change in behavior. We're here to talk about whether a patient needs a mammogram or a colonoscopy. We're here to help with advanced care planning. Having a place that manages all these things is a great service."

When Mary became a patient at the clinic last year, she quickly bonded with Alison Schlenger, her NP.

"She had reached the point where seeing a regular doctor didn't make much sense anymore," says Lloyd. "Mary loved

and trusted Alison, which was reassuring for both of us."

Although Mary has now transitioned to hospice care, Lloyd says their life retains its small pleasures. She smiles at jokes, celebrates communion once a week, and still loves desserts and rides in Lloyd's convertible. When a local performer sang a few favorite Barbra Streisand numbers just for her, Mary mouthed the words to every song.

"It's not all downhill," says Lloyd. "Mary still enjoys many things. And it's a tremendous relief to see her happy and well cared for." **EHD**

To support

nursing initiatives like Emory's holistic model of care for patients with dementia and related illnesses, contact **Amy Dorrill at 404.727.6264 or amy.dorrill@emory.edu.**

FAST FACTS: THE INTEGRATED MEMORY CARE CLINIC

- Nurse-led primary care and dementia services
- A hospitalization rate of less than 1%, well below the national average
- A 97% patient satisfaction rate
- More than 300 patients treated since opening in 2016
- Average age of patients: 78.6
- First clinic to test SimpleC, a new app that uses songs, photos, and recordings of familiar voices to stimulate patients' memories
- Received highest rating—Level 3 Patient-Centered Medical Home—by the National Committee for Quality Assurance.

To learn more about Emory's Integrated Memory Care Clinic, visit emory.link/IMCC or call 404-712-6929.

“Cancer is the story of hope. How could it not be? When you get it, you hope it goes away. That’s why you show up for the infusions, trials, and tests.—DAVID LEE NELSON, BLOGGER



4/19 I’ve decided I’m not going to say “chemo” anymore, but instead use the full word. Chemotherapy.

The therapy part has a nice ring to it, like there are going to be scented candles and carafes of water with cucumbers. “I’m here for my chemotherapy. Where’s my robe?”

Two days ago, they found more cancer in my lymph nodes. So candles or no candles, chemotherapy was something I needed. And today is the first day. It felt like the first day of school. I laid out my outfit the night before. I bought snacks. I was nervous.

But I also was excited to get the whole thing started because I was tired of building it up in my head. Our brains can take the thinnest reed and twist it and turn it and spin it out of control.

Besides, it’s never the things you worry about that become problems. I was worried about booking an audition, or if my car would make it to 200,000 miles. I was certainly never worried about Stage 4 colon cancer. But here we are.

6/24 I love summer—hot weather, lots of daylight, fireflies, the smell of suntan lotion in the morning. I’m a Leo, I like being tan, summer is my time. So why do I go all emo on the solstice?

Because it’s the peak. The first day of summer is also the beginning of the long, slow descent into winter. (In case you are reading this blog 100 years from now, winter was the time it used to be cold.) No matter that I have months and months of sunshine ahead of me, the fact that the days are slowly getting shorter is enough to make me spend the solstice moping, sad about what is to come.

This year, however, I didn’t feel that way. I think I have cancer to thank for that.

One of the side effects of chemo is that it has radically altered my perspective. For example: today I feel amazing. Today my brain is sharp and my fingers are typing well. I don’t feel nauseous or nervous. I feel normal.

Next week, however, I won’t. From the first flush of saline on Wednesday to the last of the chemo brain on Monday, it’s an unpleasant six days. But I can’t spend the days I feel good worrying about the days I’ll feel bad. So I don’t.

This attitude has, thankfully, spread to other areas of my life. This year, on the first day of summer, I didn’t worry about the cold and darkness to come. I just sat on my grandmother’s front porch with my mom and enjoyed the day. I listened to the Cubs game and watched the fire ants scurry around. I breathed in the fresh-cut grass. And I waited for the two egrets that nest at the farm to fly smooth and low across the pond.

6/29 Chemo is boring. It’s like having to watch three French movies in a row. “I’ve sat here all day, nothing happened, and now I feel sick.”

They don’t tell you that when you first start. They tell you about the nausea and the hair loss but they don’t tell you that you’ll get so bored you’ll want to stab yourself in the eye with a pencil. That you’ll get way too excited when the snack cart comes around

and you get some SunChips and a Kind bar, which breaks up the monotony of sitting under fluorescent lights staring at the wall.

It's not like that at first. There's something exciting about those initial visits. Chatting with my lab techs. Getting to know my nurses. There are questions to be asked and crossword puzzles to do. But now that I'm on treatment 6, small talk is harder. Even though I know what these bags are and what they are going to do, I ask the questions anyway just to have something to talk about.

The crossword puzzles have lost their excitement, I've finished listening to "S Town" and "Serial," and I don't feel like reading. I'd rather be at the beach or the pool or at work. Anywhere but hooked up to this IV. Not that I'm not thankful. I know it's good. I'd rather have boring chemo than exciting cancer.

We smile through the pain, through the boredom, because we know that what's on the other side—hopefully—is life.



6/30 It's amazing the things cancer has made me less afraid of: Bugs. Needles. Turning 40.

I have a vivid memory of my Uncle Lenn turning 40. I remember the pictures of the black balloons and

the coffin-shaped birthday cake. It was a weird thing for an 11-year-old to see. Like, okay, turning 40 means you're almost dead, got it. Let's file that away for a therapist to deal with down the road.

So now, I'm less than a month away from my 39th birthday. I've never really liked birthdays, and you could make the case that 39 is the worst birthday of all. It's kind of the last call for your youth—like the bartender should be shouting over the music, "Any last minute, stupid things you want to do, do them now. At 40, all excuses stop!"

Birthdays also made me feel the weight of getting older. I'd look at my life/career checklist to see if I was far enough along to justify another year being tacked on to my life. I did a lot of things in my 30s: Quit drinking. Got divorced. Left New York. Fell in love a

few times. Moved to Atlanta. Became a playwright. Became a professor. Quit smoking. Got cancer. Went to Europe twice.

I'm not rich, yet. I'm not famous, yet. But I am happy. Thanks to cancer, that seems more important than ever.

So bring on 39. And 40. And any more you might have. I'll gladly take all of them.

7/5 When I was a kid, I hated to spend the night away from home. I used to wake up in the middle of the night, in the dark, in a strange bed, so far from morning. I wanted the light to come in so I could wake up and go be in my own space.

I thought about that feeling today, because it is officially the halfway point of my treatment. I'm in between treatments 6 and 7. Yesterday I was closer to the beginning than the end, tomorrow I'll be closer to the end than the beginning.

Back at the start of the year, when I was not feeling well and had no idea what was wrong, it was the not knowing that drove me crazy.

Now it's the knowing that's hard: Knowing how the chemo will feel, knowing that my mouth will taste like metal, knowing that the chemo brain will last until Monday, and knowing that—today—I'm right in the middle of it all.



7/21 One of the things that is helping me through this process is to view having cancer as an artistic endeavor. It helps give the whole experience meaning and purpose. A context. But it drives me a little crazy

having no idea how this is going to end.

I'm in the middle of a story with a huge conflict (life or death), a brilliant antagonist (cancer), and no idea what the ending is. What I'm left with is hope.

To read more of actor, playwright, and comedian David Nelson's blog about being a patient at Emory's Winship Cancer Institute, go to davidleelson.com/blog.



Simply Put: **Vaccination Saves Lives**

In the United States, children are recommended to be vaccinated against 16 diseases. All of these diseases have been reduced by more than 90% and many have been eliminated or reduced by 99%.

In addition to saving the lives of our children, vaccination has resulted in about \$69 billion in economic benefits to society.

The only human disease ever eradicated, smallpox, was eradicated using a vaccine. A second, polio, is near eradication, also using vaccines.

Vaccines not only provide individual protection for the individuals who are vaccinated, they can provide community protection by reducing the spread of disease within a population.

Person-to-person infection occurs when someone who can transmit the disease comes in contact with someone who is susceptible. If the transmitting person only comes in contact with immune individuals, the infection does not spread and is rapidly contained.

This “herd immunity” is an important benefit of vaccination. High levels of coverage are important not only for individual protection but for preventing disease in vulnerable groups, such as infants too young to have completed their full series of vaccines.

This is why we should remove barriers that may prevent access, like cost, and support mandates for immunization requirements for attending school.

It’s often said that vaccines save lives, but this is not strictly true—*vaccination* saves lives. A vaccine that remains in the vial is 0% effective, even if it is the best vaccine in the world.

In some sense, vaccines have become victims of their own success. Diseases that once induced fear and sparked desire for vaccines are now rare, and there is a false and dangerous sense of complacency.

And in recent years, growing numbers of people have become hesitant about vaccines due to fears of side effects, philosophical or religious beliefs, or other reasons.

This is already having an impact, as seen by a 159-case measles outbreak in the U.S. in 2015.

Still, more than 90% of parents in the U.S. say they will get all recommended noninfluenza vaccines for their children, with just 6% of parents intentionally delaying and 4% refusing one or more vaccines.

One of the major concerns has been the allegation that vaccines can cause autism, specifically:

- the combination MMR vaccine
- thimerosal, a preservative (now mostly taken out of vaccines recommended for children)
- too many vaccines.

Multiple, well-conducted studies and independent reviews of those studies by the National Academy of Medicine (formerly the Institute of Medicine) have not found vaccines to play a role in causing autism. And independent evaluation of the immunization schedule found it to be very safe.

Vaccines are perhaps the most effective disease prevention tool we have—both for the person being vaccinated and the community in which they live. **EHD**

Written for the Proceedings of the National Academy of Sciences.



*By **Walter Orenstein** and **Rafi Ahmed**, associate director and director of the Emory Vaccine Center, respectively.*

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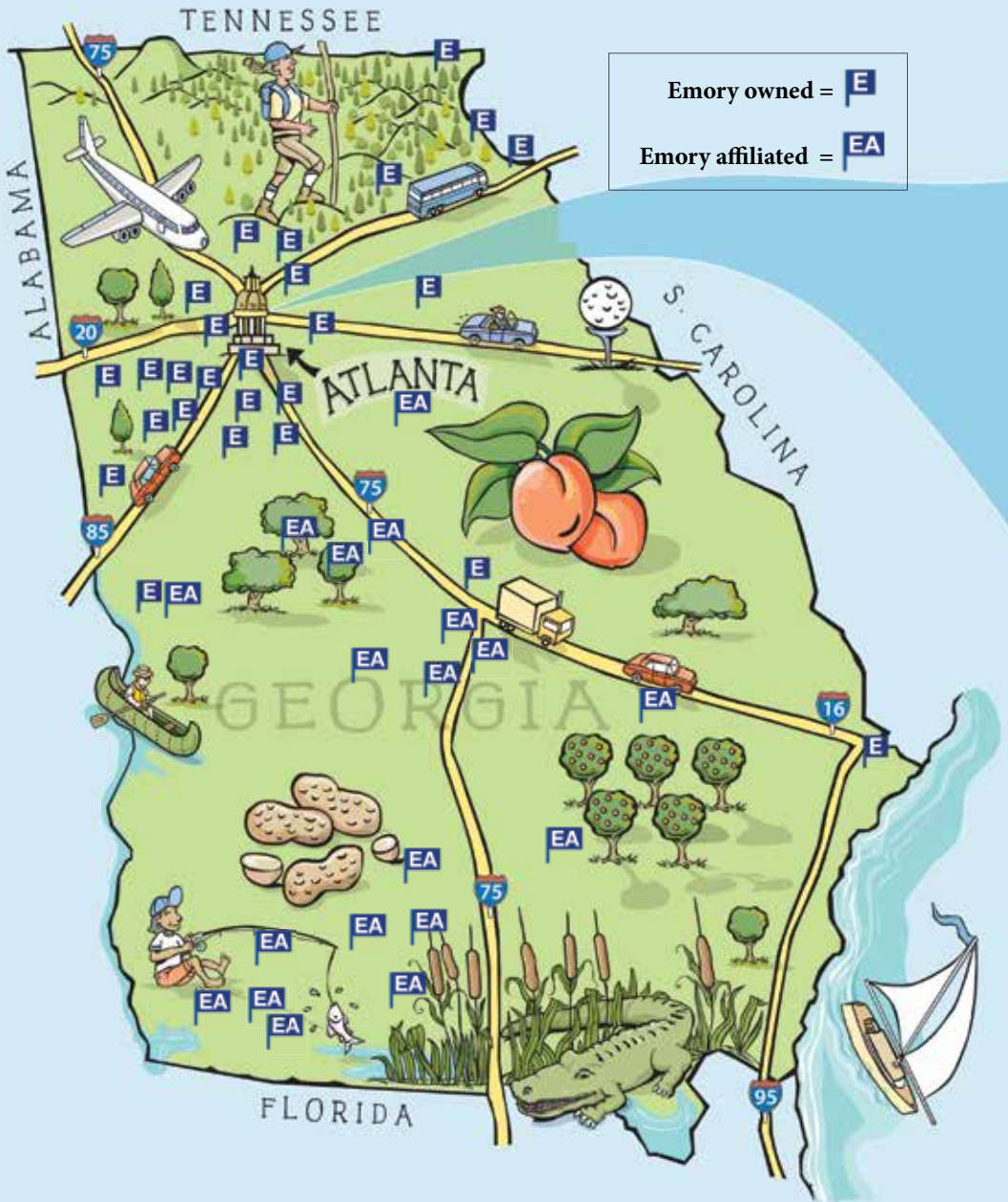
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Emory student Kaela Kuitouchou spent the summer working at Yerkes National Primate Research Center, where she analyzed MRI scans of rhesus macaques to understand how early social experiences and maternal care affect the developing brain. Emory Photo/Video



Across the State and Around the Corner



Emory Healthcare in Georgia

Emory Healthcare is the most comprehensive health system in the state, with locations all over Georgia, including seven hospitals, outpatient locations in 26 counties, and regional affiliate hospitals in another 19 counties.



The Clifton Corridor ... and Beyond

1. Emory University Hospital
 2. Emory University Hospital Tower
 3. Emory Clinic (multiple buildings)
 4. Winship Cancer Institute
 5. Emory Rehabilitation Hospital
 6. Yerkes National Primate Research Center
 7. Emory School of Medicine (education and research buildings)
 8. Woodruff Health Sciences Center Administration Building
 9. Rollins School of Public Health
 10. Nell Hodgson Woodruff School of Nursing
 11. Emory University Hospital Midtown
- * **Executive Park** (Emory Healthcare clinics in brain health, orthopaedics, and sports medicine)