Ebola Lives in Wastewater

An Ebola patient can excrete up to 10 liters of liquid waste each day. During the recent Ebola outbreak, experts at the World Health Organization and U.S. Centers for Disease Control and Prevention advised affected countries to dispose of that waste into latrines and sewage systems without disinfection, believing the virus wouldn’t remain active long in such an environment.

In a study published in the August Environmental Science & Technology Letters, Pitt’s Kyle Bibby found that the virus persists for up to eight days in wastewater. The issue is “far more complex and more poorly understood than scientists previously thought,” says Bibby, a PhD and assistant professor of civil and environmental engineering and of computational and systems biology. He adds that, although there’s never been a documented case of waterborne Ebola transmission, “the results emphasize the value of a precautionary approach and the development of wastewater protocols for epidemic situations.” —Nancy Averett

FOOTNOTE

A five-year review of U.S. neurosurgical residency programs published in the Journal of Neurosurgery last year ranked Pitt’s program third of 103 accredited residencies—notably, ahead of Brigham & Women’s and Johns Hopkins. Publishing prowess and citations informed the rankings. In other noggin news: Pitt researchers are also #1 for publications on traumatic brain injury.

KAZAKHSTAN SCHOOL OPENS WITH PITT HELP

It’s a universal truth. Whether in Kazakhstan or the United States, new medical students look the same—nervous.

This August, the republic’s Nazarbayev University School of Medicine (NUSOM) welcomed its inaugural class of 20 students to begin a U.S.-style, English-language curriculum taught by faculty from Kazakhstan and other parts of the world. The university had tapped Pitt for help in developing its medical school in the capital city of Astana in 2013, and progress has been rapid.

NUSOM opened under the guidance of its founding dean, Massimo Pignatelli, an MD/PhD, Pitt clinical professor of pathology, and former head of the School of Medicine at the University of Glasgow in Scotland. Students were welcomed with an official White Coat Ceremony in an auditorium not so different from the crimson-seated lecture room in Scaife Hall.

“The University of Pittsburgh School of Medicine is both honored and humbled to be Nazarbayev University’s strategic academic partner in this bold experiment,” noted Maggie McDonald, a PhD and Pitt associate vice chancellor for academic affairs, health sciences, at the opening ceremonies. —Lori Ferguson
Overheard

Bolstering Clinical Research Careers

Physician-scientists—docs who work in the clinic and also pursue research—are invaluable in translating insights from the bench to patient care. Yet, physicians with this double expertise are an endangered species, says Wishwa Kapoor (above), an MD/MPH and director of the Institute for Clinical Research Education at the University of Pittsburgh.

According to a comprehensive assessment by the National Institutes of Health last year, the average age of physician-scientists is rising, and pressures in today’s funding climate create additional challenges for young trainees. Kapoor notes that many programs at Pitt are attempting to address the shortage: from summer institutes for kids to seminars on work-life balance for junior faculty.

What are some of the factors contributing to the leaky pipeline?

Becoming a physician-scientist requires more training, and you often start out with more debt; research salaries are also lower than clinical salaries at the start.

Also, in my view, these careers are a lot harder than being a physician in practice. Not that being a physician is easy, but the path is relatively straightforward: You join a practice and, generally, patients keep coming. As a physician-scientist, though, you have to take the reins and guide your career in a creative way—ask the right questions, develop your research program, get the grants. There’s a significant degree of burnout because of the stress of trying to get funding.

How can institutions help trainees succeed?

We need to make this track more accessible to younger researchers and to train and retain more women and minorities. There is no magic-bullet solution. The focus must be not just on recruitment, but on sustaining and supporting these investigators. But I think the most important component of success is mentorship. Young investigators need mentors who can devote time to them and who are committed to promoting their careers—both at the home institution and with outside colleagues.

What mentors from early in your career stand out?

I had a couple of excellent mentors [like Pitt’s former chair of medicine Gerald Levey and former chief of general internal medicine Michael Karpf] who spent a lot of time with me. English is a second language for me, so I was a terrible writer. They helped me with study design, and they helped me learn to write—that’s what really made the difference. —Interview by Alla Katsnelson

Faculty Snapshots

Juan Fernandez-Miranda has secured a five-year, $1.8 million grant to continue his research in language deficits and neuroplasticity in aphasic stroke patients. Fernandez-Miranda, an MD, associate professor of neurological surgery, and director of the Fiber Tractography Lab, is working with speech-language pathologist William Hula, a PhD at the VA Pittsburgh Healthcare System, to understand whether targeted behavior therapy structurally alters the brain and results in speech recovery. The award is funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development and the National Institute on Deafness and Other Communication Disorders.

In the past 10 years, a team at Pitt’s Center for Medical Countermeasures Against Radiation (CMCR) has patented two drugs that mitigate the effect of radiation on the body, specifically radiation emitted during emergencies like terrorist attacks or reactor meltdowns. (These drugs have also been effective in treating patients with head and neck cancer who have undergone radiation.) Led by Joel Greenberger, an MD and chair of the Department of Radiation Oncology, the team received its third renewal of a five-year, $18.4 million grant from the National Institute of Allergy and Infectious Diseases. Next, CMCR’s research will focus on the discovery of drug-delivery systems for these medications, as well as treatment options for radiation-triggered disease.

Can bioactive molecules in broccoli lower the risk of cancer from environmental toxins? Thomas Kensler and colleagues are about to dig deeper for answers, thanks to funding from the National Cancer Institute (NCI). Kensler, a PhD, professor of pharmacology and chemical biology, and coleader for the Cancer Epidemiology and Prevention Program at the University of Pittsburgh Cancer Institute, received a $6.3 million Outstanding Investigator Award—created this year by NCI.

Lori Shutter and Gabriella Gosman have been selected for the Executive Leadership in Academic Medicine (ELAM) fellowship program at Drexel University College of Medicine. ELAM prepares its fellows for senior leadership roles. Shutter, an MD, is vice chair of critical care medicine education, professor of critical care medicine, neurology, and neurological surgery, and medical director of the neurovascular and neurotrauma ICUs at UPMC Presbyterian. Gosman, an MD, is vice chair for education and associate professor of obstetrics, gynecology, and reproductive sciences. She is also program director of the ob/gyn residency and associate designated institutional officer of UPMC Graduate Medical Education. —Kristin Bundy
Cheat Sheet on the Class of 2019

Allow us to introduce a few members of the Class of ’19 now roaming the hallowed halls of Scaife:

While in the Peace Corps, Matthew Allen educated Fijians on the importance of healthful eating and physical activity and on the dangers of smoking. “What I really liked was the intersection [of] medicine and psychology, the behavior-change aspect of things,” says Allen, a psych grad from the University of Virginia. Allen aims to become a primary care physician, incorporating the community health models he learned in Fiji into patient care.

Before enrolling in the School of Medicine, Claire Becker studied Spanish and English at Pomona College, taught visually impaired high school students, and earned her master of fine arts in creative writing. “Studying literature has helped in the way I am able to communicate,” she says.

During his undergrad years at Pitt, Aric Berning studied biology and theatre, so becoming one of Pitt’s standardized patients—i.e., actors trained to simulate clinical scenarios for med students—just made sense. “That was a blast,” he says. “It’s a way to give the medical students a chance to practice without actually hurting someone in the real world.” Berning is also an adjunct professor at Pitt, teaching organic chemistry laboratory classes.

When Sangki Oak deployed to Afghanistan as a medic in 2009, he and another medic were tasked with opening a small clinic to treat patients in a remote town. Hundreds of people showed up, though the clinic had limited medical supplies. One of the patients was an ashen-gray 1-year-old carried in by her father. Oak couldn’t figure out what was wrong with her, so he sent her to a larger center that could offer more comprehensive care. That was the turning point for him: He recalls thinking, I can’t be happy just being a medic . . . in a situation like this. I need to know more. Okay, I need to go to med school. —Brady Langmann

Deep ZZZs

Maybe we can choose how long we sleep—but how deeply might depend on where our ancestors rested their heads at night.

A new study published in SLEEP showed that African ancestry is directly related to lower levels of slow-wave sleep (SWS)—the deep sleep during which the body restores essential physiological processes in organ systems. The study, led by Martica Hall, PhD professor of psychiatry, psychology, and clinical and translational science, and Indrani Halder, PhD assistant professor of medicine, examined sleep patterns of 70 African American and 101 European American adults.

“The greater your African ancestry, the less deep your sleep,” says Hall. (The African American participants’ genetic African roots ranged from 33 to 88 percent.)

Previous studies have shown that black populations tend to have shorter, more fragmented sleep compared to white ones; those results were linked, in part, with stress from perceived discrimination and lower socioeconomic status. But Hall and colleagues found that between 9 and 11 percent of the differences in SWS were linked to genetic ancestry, even after adjusting for these psychosocial variables.

“In the United States, we have remarkable, persistent race disparities in health—and that’s including both mental and physical health,” Hall says. “What these data tell us is that, maybe, the race differences in sleep that we see [contribute] to the race differences in health that plague our nation.”

Hall is hopeful that this study could lead to clearer causal evidence in health disparities in African Americans, informing future therapies and public policy. —KB

RIP, BLACKLIGHT

A giant of genome sequencing retired last year after five years of service to the academic world. A fond adieu to the Pittsburgh Supercomputing Center’s Blacklight—which, among other tasks, assembled complete genomic codes cheaper and years faster than machines preceding it. (We mean that literally: It fully sequenced genomes from base reads in a matter of weeks, as opposed to years.)

Blacklight is remembered by its coworkers as a team player, working nights and weekends to churn out data. It even extended its stay six months longer than expected. It’s been replaced by a whippersnapper named Bridges, anticipated to have 12 times the memory capacity. Blacklight looks forward to mai tais on the beach or, more realistically, being broken up and sold for parts. —KB
Appointments

The brain care program at Children’s Hospital of Pittsburgh of UPMC has a new medical director—
Robert Clark (Fel ’95), an MD, chief of the Division of Pediatric Critical Care Medicine at Children’s, and professor of critical care medicine and pediatrics. For the program, Clark plans to harness the wealth of electronic medical record data at Children’s to quantify current human and health care costs and ultimately use those data to bolster patient outcomes. Clark advocates moving further away from the traditional “pass-the-baton” approach between specialists to a more integrated, team-based concept of care.

Gastrointestinal immunologist Timothy Hand, a PhD, recently joined Children’s Hospital of Pittsburgh of UPMC and the School of Medicine as an assistant professor of pediatrics; he comes from the National Institute of Allergy and Infectious Diseases. Hand was named one of four scholars within the Richard King Mellon Foundation Institute for Pediatric Research; his work explores immunological modulation in the gut and its interaction with invading pathogens and the microbiome. This research could have implications for Crohn’s disease, enteric (intestinal) infections, and food allergies.

Chris Donnelly, a PhD and assistant professor of neurobiology, has joined the University’s Brain Institute to lead a major new basic science initiative to understand the molecular mechanisms of amyotrophic lateral sclerosis (ALS). Donnelly recently published findings in Nature suggesting that clearing a blocked passageway between the nucleus and the cytoplasm in motor neurons may be an approach to treatment. Donnelly’s research will be based in the new Live Like Lou Center for ALS Research.

Also new to the Brain Institute—Amantha Thathiah, a PhD assistant professor of neurobiology. Thathiah joins Pitt from the University of Leuven and VIB Center for the Biology of Disease in Belgium, where she worked to understand the pathogenesis of Alzheimer’s disease. Most recently, she published findings in Science Translational Medicine showing that genetic deletion of the orphan G-protein-coupled receptor GPR3 alleviates memory deficits and reduces the amyloid plaque burden in Alzheimer’s disease mouse models. Her studies suggest that GPR3 could be a therapeutic target in drug treatment for Alzheimer’s. —KB

BEATS OF THE BRAIN

When Jacobo Mintzer, a neurodegeneration expert, saw a recital featuring cellist Norbert Lewandowski of the Pittsburgh New Music Ensemble and Charleston Symphony Orchestra, he wanted a closer look—at Lewandowski’s brain. When Lewandowski performs, he often closes his eyes, which made Mintzer curious about how the cellist perceives each composition.

With Lewandowski’s blessing, Mintzer, of the Clinical Biotechnology Research Institute in Charleston, S.C., contacted Pitt’s Alzheimer Disease Research Center’s Oscar Lopez, an MD, and James Becker, a PhD, to use UPMC’s magnetoencephalography (MEG) machine—which can map neural activity down to the millisecond. During MEG and MRI sessions, the scientists asked Lewandowski to listen to his own recording of Andy Akiho’s “Three Shades, Foreshadows” and imagine replaying the cello track. From this, they attempted to visualize how his mind works during a performance. When the piece slowed, the images of Lewandowski’s brain flashed red and yellow, anticipating the crescendo; but as the song built, it glazed blue and green, resting for the next buildup. His brain activated most during the softest measures.

“It’s extremely interesting,” Lopez says. He suggests that knowing how parts of the brain react to music could lead to better treatment and improved cognition for head-trauma victims, though neuroimaging studies on music’s role in cognitive rehabilitation are relatively new.

In September, Lewandowski played a solo show in Charleston—this time, for a roomful of doctors. He performed the Akiho composition as a screen behind him played the recorded images of his brain flashing (see above). —BL