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Inflammation
the body’s friendly fire

Gravesite in Sri Lanka
Shehzad Noorani
Hyperlocal Hotspots

Each spring, Rio de Janeiro attracts well-heeled partygoers to its annual bacchanalia, Carnival. The city of 6 million has another, darker side however; one-fifth of its population lives in favelas, or slums—hotbeds for diseases that tend to cluster around the poor, such as tuberculosis and HIV.

Yet, until recently, public health researchers tended to treat Rio and most other large cities with extremely varied populations as single units with homogeneous inhabitants who had the same risk and incidence of disease.

Such thinking is slowly undergoing an evolution, says David Dowdy, MD, PhD, ScM, an assistant professor in Epidemiology. “There’s a growing awareness in tuberculosis and other diseases that we can’t just adopt one-size-fits-all strategies,” he says.

Consequently, Dowdy and other researchers are shifting tactics, focusing on far smaller areas to study diseases. By blocking off such disease “hotspots”—even to the neighborhood level—investigators are gathering fresh data that could eventually lead to novel ways to combat age-old diseases.

Smaller and Smaller

This hyperlocal focus isn’t totally new to public health, Dowdy explains. More than 150 years ago, John Snow famously traced the source of a cholera epidemic to a single London water pump by plotting cases in a neighborhood on a map. Since then, the hotspot approach has been a mainstay for a variety of infectious diseases, notably sexually transmitted diseases (STDs). To combat STDs, health workers focus on tried-and-true reservoirs—sex workers, for example, or people unlikely to take precautions for safe sex, such as teenagers.

“For STDs, parasitic infections and many other infectious diseases, there’s a widely known 80/20 rule,” says Dowdy. “Twenty percent of the population is responsible for 80 percent of transmission.”
In infectious disease outbreaks, those 80/20 diseases have provided natural targets for interventions. Henrik Salje, a doctoral candidate in Epidemiology, explains that it’s been significantly trickier, however, to focus intervention efforts in endemic settings because numerous overlapping transmission chains occur in the same areas and it is unclear who is responsible for the majority of infections. This has discouraged researchers from even bothering to look for disease hotspots or clusters—until now. Recently, he and other investigators have started examining disease transmission and prevention in smaller and smaller areas—tracking dengue transmission within neighborhoods, for example.

Why now? It’s all a matter of technology, explains Salje’s colleague Justin Lessler, PhD ’08, MHS ’08, MS, an assistant professor in Epidemiology. “There’s been this great increase in our ability to collect really fine-scale spatial data,” he says. “There is now wide availability of cheap and accurate GPS systems … most people have them on their phones by default.”

Combining GPS with better software to organize multiple types of data now allows researchers to easily “put a dot on a map,” and combine information in ways that they hadn’t been able to before, says Salje. “We can plot the location of a particular case and the time it happened, and even include genetic information of the culprit organism,” he adds. Genetic information is much more available because of increasingly sophisticated, cheaper technology.

**Surprisingly Focal**

Such work is exactly what Salje, Lessler, and Derek Cummings, PhD, MPH, MSc, assistant professor in Epidemiology and International Health, are doing with dengue. In a study published in the May 28 *Proceedings of the National Academy of Sciences (PNAS)*, they used geocoding to better understand how dengue, and immunity to this virus, spreads throughout individuals in Bangkok.

The researchers used data gathered over five years from a Bangkok children’s hospital. When patients with dengue-like symptoms came to the hospital for treatment, care providers there drew blood and sent it off for diagnoses—and, if it was positive for dengue, checked which of four viral serotypes caused the infection. Additionally, patients provided basic demographic information, including their addresses.

Once someone has been exposed to a single dengue serotype, they’re immune to that particular serotype for life, Salje explains. Preliminary but decades-old research suggests that they’re also immune to the other three for a stretch of several more months. But dengue is unusual in that if former patients are exposed to any of the other serotypes after this grace period, the resulting disease is much more severe.

To confirm this research and learn just how close cases cluster, the researchers used three basic pieces of information about the patient: the time they became sick, where they lived, and which serotype caused the infection. Using these data and geocoding technology to plot thousands of cases on maps over time, the researchers found that cases of the same serotype—suggesting that they might come from a single lineage of infection, passed from individual to individual—were occurring in areas smaller than a square kilometer. Dengue in these communities followed the same track as previous research suggested. Neighborhoods had a localized outbreak of a single serotype, followed by a period with few or no cases lasting many months, and then they were more likely to have severe disease caused by other serotypes.

Though Bangkok is full of commuters who could easily pass infections all over the city, the disease still clustered around homes, Lessler says. “It’s far more focal than we would have realized without these data,” he adds. The finding eventually could allow researchers better ways to implement prevention efforts or test whether vaccines in development are working.

**Better Targets**

Similarly, in Rio de Janeiro, Dowdy’s work on tuberculosis is showing that a small reservoir of individuals could be the key for slowing or stopping this disease’s spread throughout the entire city.

He and his colleagues used past surveillance data to narrow their focus to three areas—comprising about 6 percent of Rio’s population—that appeared to be hotspots for the disease, with TB rates at least double those of the rest of the city. Using additional data on how TB passes through populations from other cities, they constructed computer models to see how tuberculosis transmitted throughout the hotspots and from these hotspots to the rest of the city.

Their findings, also published in the May 28 *PNAS*, suggested that this mere 6 percent of Rio is responsible for more than 35 percent of TB transmission within the entire city. If prevention and treatment efforts were targeted at just this population, Dowdy says, their models showed the same effect in diminishing tuberculosis over time as targeting the other 94 percent of the city.

However, there is a catch: Targeting this tiny population could prove more difficult and expensive per individual than targeting the majority of the city.

“These hotspots are going to have fewer existing resources, people are less connected to care, and they’re not going to have the same diagnostic and treatment infrastructure,” Dowdy says.

But in the end, it could add up to a better investment. “Even if it’s 10 times more expensive per person, you’re still getting the same effect for 6 percent of the population rather than 94 percent,” Dowdy says. “It’s more bang for your buck.” —Christen Brownlee
Like many great inspirations, the Social Innovation Lab (SIL) emerged from a casual kitchen conversation. Jessica Ladd, MPH ’11, and her then roommate Mélodie Kinet, MPH ’11, MBA, were swapping stories about their nonprofit efforts.

In the quest for sustainability for her project combating STDs, Ladd discovered “there was not a lot of support as to how to proceed”—despite a growing number of students interested in creating nonprofits. Ladd’s project, Sexual Health Innovations, and Kinet’s Sustainable Roots initiative (see box) were radically different, but they had the same needs crucial to any nonprofit launch: everything from how to draft a mission statement to how to raise funds.

Ladd and Kinet’s initial discussion evolved into the peer-driven Social Innovation Lab, a student incubator whose primary purpose is to help “students already working on projects focused on social good to get to the next stage with their projects,” says Ladd, now a third-year PhD candidate in Epidemiology. Launched in August 2011, SIL sponsors a small group of projects by sharing resources and mentoring. The group also hosts biweekly check-in meetings where students draft mission statements, solve problems and network.

While SIL does not supply funding, it does offer the extraordinarily rich expertise of Johns Hopkins students from the Bloomberg School, the School of Medicine, the Carey Business School and the Whiting School of Engineering, as well as social design graduate students from the Maryland Institute College of Art. “Social innovation comes from the fringes, from people coming together and exchanging ideas,” says Ladd. “We need [collaborators in] business, computer science, graphic design, medical fact checkers, pro-bono legal services—[areas] that the School of Public Health didn’t have.” Next year, Ladd hopes to add local experts and faculty mentors who are also drawn from these specialties.

Health-related SIL projects range from the local to the international, from technology based to community based. “The best thing about SIL for me has been connecting with peers from different schools [who are] interested in pursuing the same kinds of endeavors—and connecting with those people to get from idea to research to real world setting,” says medical student Ralph Passarella, who’s launching a Web app called ReifyHealth.

SIL is “like a clearinghouse that connects people with like interests,” says Khadijah Mitchell, a medical student and the founder of Junior Biomedical Scholars. “It’s like the Jessica magic; she can connect people.”

Mitchell says that SIL introduced her to nonprofit leaders from around the city, helped her target financial support from medical organizations and taught her to formulate a pitch about her project and "to refine—not define—[my] mission."

SIL also has the enthusiastic support of Marie Diener-West, PhD ’84, chair of the School’s Master of Public Health Program and the Abbey-Merrell Professor of Biostatistics Education. “What I think is so exciting about the Social Innovation Lab is that it is a student-run initiative for enabling social change,” says Diener-West. “It fosters cross-school partnerships,” she notes, and promotes the transfer of valuable skills and information that students won’t necessarily learn in the classroom.

Says Ladd, “It’s great from a learning perspective. If you have your own project, everything else you are learning [in school] becomes relevant. And when you can take the information you’ve learned that took days upon days to accumulate and can give it to someone else in five minutes … that’s really satisfying and really efficient.”

—Mary K. Zajac

**Taking socially beneficial ideas to the next level: Jessica Ladd, Ralph Passarella and Jack Hirsch.**
Leading Liberian Health

The civil war burning through much of Liberia reached Tolbert Nyenswah and his family in the mid-1990s. It uprooted them from their home in the southern province of Sinoe and forced them to relocate to a refugee camp in Tabou, Ivory Coast.

“We walked for three months [to reach the camp], hiding in bushes and eating roots to survive,” he says. In the camp, he saw children die from diarrhea and disease.

The experience still echoes within, motivating him to become what he calls “a champion of global health with emphasis on community-based health services.”

Just before he graduated in May, Nyenswah, LLB, MPH ’12, received a letter from President Ellen Johnson Sirleaf appointing him assistant minister of Health and Social Welfare/deputy chief medical officer of Preventive Services.

It’s been a long journey to his dream. After Nyenswah and his family returned to Liberia from Ivory Coast, he earned degrees in biology and chemistry and a law degree. He became deputy program manager of Liberia’s National Malaria Control Program. There, he crafted policies for the treatment, prevention and control of the disease that affects 3.5 million Liberians and is the leading cause of death for pregnant women and children under 5. Although the program distributed more than 5 million mosquito nets and treated 2.5 million malaria episodes in 2010–2011, Nyenswah came to the Bloomberg School after deciding that he needed formal study in public health in order to be an even stronger health advocate.

Even so, he brought a wealth of direct experience about malaria treatment and prevention to the classroom. Tolbert was “more of a colleague [than a student] in the field of malaria,” says his capstone advisor William Brieger, DrPH ’92, MPH, an International Health professor and a senior malaria specialist with Jhpiego.

In his new position, Nyenswah says he is supervising an expanded immunization program and collaborating on maternal and child health issues. “Something I’m taking home is [the idea of] making change through policy,” says Nyenswah, whose new position, he says, puts him “at the epicenter for the implementation of the essential package of health services that is the cornerstone of Liberia’s 10-year National Health Plan and Policy [2011–2021].”

Since Nyenswah’s return to Liberia in June, he has been deeply involved with creating community-based health care services, particularly in communities where public health infrastructure has been decimated by violence. His MPH studies, he says, have given him a newfound “confidence that you can deliver the necessary services anywhere.”

It’s this kind of optimism that inspires Henry B. Perry, MD, PhD, MPH ’71, senior associate in International Health and Nyenswah’s mentor. “What I learned from [Tolbert] was that it really is possible for an individual to make a difference in government programs,” says Perry of Nyenswah’s work with Liberia’s malaria program. “Tolbert is an exceptional person with a strong personal commitment. Even though he is not a physician, he obtained specialized training and will put it to good use as a strong leader with a focus on engaging communities.”

Although Nyenswah looks forward to working further with American colleagues and institutions to promote global health in both Liberia and in Africa, he is pleased to be home in Monrovia, he says, “serving my country and my people.”

—Mary K. Zajac
HIV’s Confounding Superpowers

As a founder of the Rakai Health Sciences Program in Uganda, Maria Wawer, MD, MHSc, has led some of the most influential HIV/AIDS research in the past two decades. Still, the cunning of the HIV virus sometimes astonishes even her.

New research from Rakai upends conventional thinking about the virus’s powers of superinfection, a condition in which an HIV-infected person later acquires a second, new viral strain.

The first study of superinfection in a general population, published online June 5 in the Journal of Infectious Diseases, suggests that it is more common than initially thought and is not limited to groups at high risk for HIV, such as sex workers and intravenous drug users.

“The study shows that superinfection … is not rare, and the implications for vaccine and other prevention research may be quite substantial,” says Wawer, a senior author of the study and professor in Epidemiology. “This is one clever virus.”

Although the first cases of HIV superinfection were identified more than 10 years ago, there has been ongoing debate about how frequently it occurs.

Earlier superinfection studies focused primarily on high-risk populations—Kenyan sex workers, intravenous drug users in Thailand and men in the U.S. who have sex with men.

The big question for Andrew Redd, PhD, staff scientist at the National Institute of Allergy and Infectious Diseases and lead author of the new study: How common is superinfection in a broader heterosexual population?

For answers, he turned to the Rakai Program, which follows the health of a 14,000-member cohort and has a massive data repository of blood samples and interviews to better understand HIV transmission and prevention.

“The monitoring of this population for 18 years gave us the statistical power and samples to take a look at this question in a general population,” says Redd. “It’s an ideal place to compare rates of diseases because people aren’t selected on risk factors or certain characteristics. If you live in this village, you’re asked to join the study.”

Researchers tested HIV-positive blood specimens collected between 1998 and 2004 from 149 randomly selected members of the Rakai cohort. They looked at two samples: one taken at the time of initial HIV diagnosis and the second up to eight years later, but prior to when the patients began antiretroviral (ARV) therapy.

Using a highly sensitive ultra-deep virus sequencing technology, scientists captured “snapshots” of the entire virus population and identified seven cases of superinfection. The observed superinfection rate in this study was 1.4 per 100 person years.

The finding raises important questions about the immune system response of the initial HIV virus and may have implications for future vaccine design, Redd says.

Says Wawer: “We need to do a lot more work with our immunology colleagues to try to understand why the initial infection does not protect persons from superinfection.”

From a clinical standpoint, based on existing research, a diagnosis of superinfection doesn’t appear to diminish the effectiveness of ARV therapy, the standard treatment for HIV. However, scientists have voiced other concerns, says Redd. It’s unclear whether superinfection leads to an accelerated progression of HIV to AIDS or whether superinfection increases the transmissibility of the virus. And the potential for superinfection with an ARV-resistant strain is another unknown.

In the meantime, Redd says that it makes sense for clinicians to discuss superinfection with patients newly diagnosed as HIV positive.

“You don’t have to be high risk to be at risk for superinfection,” he says.

—Jackie Powder
The X Factor

If the skin you’re in is in good shape, you may need to thank the X.

A surprising X-shaped discovery made by Bloomberg School scientists not only reveals the core chemical architecture of nanofibers inside of skin cells but also may provide new insight about how skin manages to be an effective portal, one that’s both protective and permeable.

“From form follows function,” says Pierre Coulombe, PhD, the E.V. McCollum Professor and Chair of the Department of Biochemistry and Molecular Biology. “We found a form that was unexpected. And now we are in the early stages of revealing a new type of function for these nanofibers.”

His team was shocked to find a specific type of chemical bond called a cystine linkage lurking inside cells.

“Cystine linkages are quite abundant in biological systems, but outside cells, not in them,” Coulombe says.

The particular nanofibers that he studies originate from coiled coils of keratins, which are protein components manufactured by 70 genes. He discovered in 1991 that a mutation in one of these genes causes a disease (epidermolysis bullosa simplex) characterized by skin so fragile that it can be shredded by even minimal friction—the kind caused by well-fitting shoes. In a high-tech search for clues to reveal the mechanism, his team scrutinized the nanofiber’s most basic structural makeup using X-ray crystallography, a sophisticated technique accomplished with the assistance of Daniel Leahy and Min-Sung Kim of the Johns Hopkins School of Medicine.

Focusing on mouse skin, the researchers obtained data to suggest that the X-shaped orientation of keratin nanofibers and the associated cystine linkages concentrate around the cell’s nucleus, which houses the genome.

“This is the first evidence that the size and shape of nuclei may be impacted by a keratin nanofiber network,” says Coulombe, who credits the perseverance of Chang-Hun Lee, a former postdoc and first author of the study published in June in *Nature Structural & Molecular Biology*.

“Nine out of 10 people would have said the odd discovery of the X shape was an artifact and not bothered trying to pursue it,” he recalls. “But Chang-Hun did bother, and we found a new form that’s leading us to uncover new function.”

The next step for Coulombe’s lab is to use genetic engineering to investigate the consequences of preventing the formation of these cystine linkages and the associated X-shaped orientation of keratin nanofibers in their natural context in the skin.

The big-picture question, ultimately, is how do the sizes and shapes of nuclei—of not only skin cells, but all kinds—affect cellular processes.

“This is an area of biology that’s beginning to get traction,” Coulombe says. “For one thing, it’s going to help us understand how the skin achieves a form that allows it to be an effective interface, fostering a healthy relationship with our environment.”

—Maryalice Yakutchik
Harvested, Not Poached

As a boy, Dave Love raised oysters with his family in the marshes of Virginia. As a grad student in North Carolina, he studied shellfish and water quality. And as project director for the Public Health and Sustainable Aquaculture Project at the Johns Hopkins Center for a Livable Future (CLF), he chose oysters to star in some of his latest research.

Love, PhD, MSPH, is a systems guy. Public health, diet, food production and the environment are pieces of a single puzzle, he says, linked in constant interplay. With pressures like population growth, climate change and resource depletion, Love and his CLF colleagues work to better understand the food system and how to achieve balance.

Convinced that aquaculture—growing seafood in controlled conditions—is a powerful strategy to restore that equilibrium if sustainable methods are used, he sought a research project that could help make his case. Because oysters’ needs are simple and their benefits large—they eat what floats by and clean the water while doing so—they are the “perfect aquaculture species,” says Love.

In Maryland’s Chesapeake Bay, polluted waters are off-limits for oystering. So when Love heard that people were still occasionally getting sick from eating oysters, he wondered if the shellfish were being illegally harvested in contaminated areas. The resulting paper, just published in the Journal of Shellfish Research, sheds light on poaching patterns that highlight the need for more intensive enforcement and reveal challenges within Maryland’s wild-caught oyster industry—challenges that oyster aquaculture could solve, says Love and five co-authors.

Digging through citations issued by the state dating back to 1959, the authors found that poaching does have the potential to make people sick; about 6 percent of the tickets were for harvesting oysters out of season (contamination is more likely in warmer months) or from contaminated areas, or storing them inappropriately.

But poaching poses a greater danger to the Bay’s oyster population itself: 75 percent of citations were for harvesting too-small oysters. When oysters are harvested below market size, the population can’t rebound, Love says. Oysters are essential for a healthy Bay for two reasons: they filter the water when they eat, and they build reefs that other organisms use.

The state of Maryland has already initiated a two-pronged approach to restore the oyster population. Oyster bars in areas off-limits for harvest allow oysters to flourish, says Kennedy Paynter, a co-author and research associate professor at the University of Maryland. The bars are often intentionally located near sewage outfalls so that these oysters—not meant for consumption—can benefit from the accompanying nutrients; but any oysters poached there may be contaminated.

Without stronger enforcement, the potential for an outbreak of disease is significant.

The state is also using loan incentives to drive the shift to sustainable aquaculture. Love’s team hopes their paper will encourage such efforts to balance the interests of watermen, resource managers and public health by switching from a wild-harvest approach (which leaves openings for poachers) to a farm-raised approach, where individuals tend their own sites.

“We wanted to say to the General Assembly, ‘Here’s some evidence that shows you guys are headed in the right direction in strengthening laws for harvesting from the Bay,’” says Love.

—Rachel Wallach
Cigarette smoking, Drunk driving, Lead poisoning. They’re public health problems that trigger immediate associations with injury, illness and death. Ozone pollution, however, generally doesn’t arouse similar concern.

Environmental Health Sciences (EHS) doctoral student Jesse Berman hopes to help alter that perception of ozone, a pollutant formed by chemical reactions in sunlight and the main ingredient in smog. Decades of studies have found that exposure to unhealthy ozone levels can lead to decreased lung function, exacerbated asthma symptoms and more hospital and emergency room visits. Especially at risk are children and the elderly.

Although an individual can choose to quit smoking, abstain from alcohol before driving and protect a child from lead exposure, Berman points out that people have few options for avoiding ozone pollution.

“You can’t really do anything as an individual to reduce exposure except stay inside when the air quality is bad,” he says.

In a new study, Berman reports that exposure to ozone levels in excess of federal limits accounted for as many as 2,480 preventable deaths between 2005 and 2007. And, if more stringent regulations had been in place, he estimates that nearly 8,000 ozone-related deaths could have been avoided during the three-year period.

“The results give firm, quantifiable numbers of avoided deaths and illnesses if we [had actually met] the existing air quality standards, and the [health] effects under proposed standards,” says Berman, lead author of the study, published online July 18 in Environmental Health Perspectives.

Investigators also determined that there would have been 3 million fewer cases of acute respiratory problems and 1 million fewer lost school days if current EPA ozone regulations had been met over the last two years.

In 2010, the EPA’s Clean Air Scientific Advisory Committee recommended lowering ozone standards from 75 parts per billion to between 60 and 70 parts per billion. A year later, President Barack Obama rejected the proposal and deferred additional review until 2013, according to the study.

As EPA moves forward next year with further review of ozone standards, Frank Curriero, PhD, MA, a study co-author and EHS associate professor, suggests that the new research will be especially relevant to the process. “I can’t imagine going into any kind of discussion or review, whether from the EPA’s side or the president’s side, without this article in hand,” he says.

—Jackie Powder

Catching rays. It’s the latest strategy in the Bloomberg School’s efforts to create a greener campus. Ken Uhl (left, recently retired) and Joe Bentz of the School’s Facilities Department stand among the 110 newly installed rooftop solar panels on the Wolfe Street Building. (Another 54 solar panels top Hampton House.) The solar arrays are projected to generate 64,379 kilowatt hours of electricity per year and shrink the School’s carbon footprint by about 74,230 pounds of carbon dioxide annually. The project is part of a wide-ranging University plan to reduce carbon dioxide gases through conservation measures and new technologies.
The words “parasite,” “bacteria” and “digestive system” do not necessarily give comfort when nestled alongside one another—unless, that is, they are being used to describe the work of Marcelo Jacobs-Lorena, PhD.

Ten years ago, Jacobs-Lorena, a professor of Molecular Microbiology and Immunology, began genetically engineering mosquitoes to make them resistant to *Plasmodium*, the parasite that causes malaria—a disease that kills more than 800,000 people each year. The approach held great promise. Drug and insecticide resistance have stymied efforts to manage both *Plasmodium* and the female *Anopheles* mosquito that transmits it, and there is no vaccine.

Unfortunately, while Jacobs-Lorena’s transgenic mosquitoes performed well in the lab, there was convincing evidence that their malaria-fighting genes would be difficult to propagate in the field. So he and his colleagues at the Johns Hopkins Malaria Research Institute began searching for other ways to foil *Plasmodium*.

Their latest solution, reported in July in the *Proceedings of the National Academy of Sciences*, involves tinkering not with the mosquitoes but rather with the bacteria that live in their digestive systems—more specifically, in the midgut, a tiny tube that could become ground zero in the war against malaria.

When a female *Anopheles* mosquito bites an infected human, she ingests both blood and parasites. The latter mate in her midgut, yielding a handful of thick-skinned offspring called ookinetes. These, in turn, cross the midgut and transform into oocysts, each of which then spawns thousands of progeny that migrate to the mosquito’s salivary glands, where they stand ready to infect the next person she bites. Consequently, says Jacobs-Lorena, “the best way to interfere with the parasite is before it becomes an oocyst.”

Fortunately, nature has provided an opportunity to do just that.

“It just turns out that, like us humans, the mosquito carries lots of bacteria in its midgut,” Jacobs-Lorena says. “And every time the mosquito feeds on blood, the bacteria increase tremendously in number.”

Hence the new approach: Rather than genetically modifying the mosquitoes to knock out *Plasmodium*, modify their midgut bacteria to do the job instead.

Jacobs-Lorena and his team engineered *Pantoea agglomerans*, a bacterium commonly found in the midgut of *Anopheles* mosquitoes, to secrete five antimalarial proteins. The two most effective proteins thwarted oocyst formation of *Plasmodium falciparum* (the parasite that causes the deadliest form of malaria) by 98 percent. The technique also worked well against *P. berghei*, a species of *Plasmodium* that infects rodents, suggesting that it might work against any variety of the parasite.

In theory, this new strategy should sidestep the gene propagation problem, since distributing engineered bacteria among wild mosquitoes ought to be easier than replacing an existing mosquito population with a transgenic one. Indeed, spreading the antimalarial microbes could be as easy as baiting jars with cotton balls that have been soaked in bacteria and sugar water. (Female *Anopheles* need blood proteins to produce eggs, but also feed on nectar.)

Hurdles remain, such as securing regulatory approval to release genetically modified organisms into the wild. In the meantime, Jacobs-Lorena and his collaborators have already identified a different bacterium that holds even greater promise than *Pantoea*. And they are trying to engineer a single gene that will enable the microbe to produce several anti-malarial compounds at once.

Jacobs-Lorena suspects that, unlike his transgenic mosquitoes, these *Plasmodium*-fighting bacteria will work even better in the field than they do in the lab. If so, they will make a potent addition to an antimalarial arsenal that is in sore need of new blood.

—Alexander Gelfand

Unleashing bacteria: Marcelo Jacobs-Lorena
In a new alliance with a leading online education provider, the Bloomberg School is refreshing its commitment to free online public health education.

Johns Hopkins is among 12 top-ranked universities that partnered in July with Coursera to make high-quality education available worldwide. The School is the first Hopkins division to offer classes through Coursera, founded a year ago by two Stanford University professors with four university partners. “It’s part of our mission to disseminate our knowledge,” says James Yager, PhD, senior associate dean for Academic Affairs and the Edyth H. Schoenrich Professor in Preventive Medicine. “We felt that this level of visibility, particularly with these other institutions, was the right thing to do at the right time.”

With the first course to launch in late September, the School’s Coursera offerings include Biostatistics Bootcamp, Introduction to the U.S. Food System, and Vaccine Trials: Methods and Best Practices. At presstime, more than 100,000 people had registered for the noncredit courses.

The collaboration augments the School’s Internet-based offerings, which include 106 online credit courses and OpenCourseWare (OCW), a Web resource that makes the content from 107 courses accessible at no cost to users worldwide on a noncredit basis. OCW does not offer assignments or exams. “[Coursera] is addressing another way that people learn,” Yager says, “and we’re reaching out to provide knowledge in a slightly more formal way than OCW that will hopefully help people who could never come here.”

The target audience is “anyone in the world who has access to the Internet and who has an interest in the course topics.”

Yager says that Coursera’s approach to open learning differs from the OCW model in that it offers “mini-courses” that may include quizzes and assignments. Students can complete class evaluations and may post questions to faculty via an online bulletin board. They can also answer each other’s questions and create their own social networks of learners with shared interests.

“You can actually determine how well you’re learning by taking quizzes and getting a little bit of faculty input,” he says.

Describing the Coursera partnership as an “experiment,” Yager says that School officials will assess the extent of global interest in the curriculum, review student feedback and determine the demands on faculty.

Yager says that the commitment would be worthwhile if students found the courses to be of value and “if we were able to attract some new students to take full courses and/or enter one of our degree programs.”

—Jackie Powder

In Memoriam

Alan Gittelsohn, PhD, MPH, emeritus faculty in Biostatistics, public health and medicine, died on May 13 at age 84. A faculty member from 1964 to 1992, he made significant contributions to biostatistical applications in health care research.

John Scocca, PhD, professor emeritus in Biochemistry and Molecular Biology, died May 10 at age 72. A faculty member from 1968 to 2008, he contributed significantly to the understanding of bacterial transformation and the spread of antibiotic resistance.

Judith Shinogle, PhD ’01, MSc, an associate in Health Policy and Management, died in a car crash on May 20 at age 49. Shinogle, who held faculty positions in the University of Maryland system, was known for her health policy analysis and her health outcomes research.