A prototype method for identifying bacterial pathogens, called polarization anisotropy diagnostics (PAD), uses light to detect specific bacterial RNA sequences, and yields results for several dozen bacterial pathogens of humans within a few hours at a cost of about $2 per assay, according to Hakho Lee of Massachusetts General Hospital in Boston, Mass., and his collaborators. Details appeared in 6 May 2016 in Science Advances (doi:10.1126/sciadv.1600300).

A sensor, based on a polymeric film that specifically captures D-arabitol, a molecular marker for fungi, can rapidly detect fungal pathogens within cerebrospinal fluid, plasma, and urine specimens, according to Wlodzimierz Kutnera at the Institute of Physical Chemistry of the Polish Academy of Sciences in Warsaw and his collaborators. Details appeared 15 May 2016 in Biosensors and Bioelectronics (doi:10.1016/j.bios.2015.12.088).

Ebola virus RNA can be detected with a PCR assay, using a cellphone-sized device that yields results within less than 1 hour, according to Pavel Neužil of Northwestern Polytechnical University of Shaanxi, China, and Brno University of Technology in Brno, Czech Republic, and his collaborators. Details appeared 11 April 2016 in Analytical Chemistry (doi:10.1021/acs.analchem.6b00278).

In Tanzania, a mobile-phone-based system is being used for rabies surveillance over a large-scale area of about 150,000 km². It is being used to evaluate ongoing rabies control activities and improve their management, according to Katie Hampson from the University of Glasgow, United Kingdom (UK), and her collaborators in the UK and Tanzania. Details appeared 12 April 2016 in PLoS Medicine (doi:10.1371/journal.pmed.1002002).

Despite prolonged wrangling over how and how much to fund U.S. research on the Zika virus, the research community is making considerable progress studying this pathogen, quickly confirming its capacity to interfere with fetal development. Beyond careful tracking of this flavivirus and extensive analyses of its structure and genome, recent research efforts focus on understanding its impact on infected individuals, particularly when pregnant, on developing diagnostic tests for the virus, and on vaccine development as well as control of the mosquitoes that spread this virus.

“In less than a year, the status of Zika has changed from a mild medical curiosity to a disease with severe public health implications,” said Director-General Margaret Chan of the World Health Organization (WHO) in Geneva, Switzerland, last March. She also declared the virus “a public health emergency of international concern,” one that requires a “coordinated international response.” As of March, the virus was detected in at least 38 countries and territories. “If this pattern is confirmed beyond Latin America and the Caribbean,” she added, “the world will face a severe public health crisis.” Nonetheless, the emergency committee advising WHO on Zika “found no public health justification for restrictions on travel or trade to prevent the spread of Zika virus.”

Amid that global call for action against Zika, President Obama and members of the U.S. research and public health communities continued to voice frustration through May as they sought additional resources to investigate the Zika virus and slow its spread. One strategy, namely to repurpose resources intended for Ebola virus for use on Zika, remained stalled last May,
forcing federal officials to scramble for other stopgap funding of $600 million, a good deal short of the $1.9 billion that the Administration sought. "We find ourselves in a rare moment where we have advance warning on a disease," a White House official blogged last April. “However, Congress continues to do nothing about the emergency funding.”

Public health officials say that recent research now convinces them that Zika virus “causes microcephaly”—a link that was considered likely but not conclusive a mere few months earlier. “No single piece of evidence provides conclusive proof that Zika virus infection is a cause of microcephaly and other fetal brain defects,” noted Tom Frieden, director of the Centers for Disease Control and Prevention (CDC) in Atlanta, Ga., citing a report by Lyle Petersen, Sonja Rasmussen, and others at CDC. “Rather, increasing evidence from a number of recently published studies and a careful evaluation using established scientific criteria supports [those] conclusions.” Their analysis appeared 13 April 2016 in the New England Journal of Medicine (doi:10.1056/NEJMsr1604338).

Several sets of experiments in which mice were infected with Zika virus further support those conclusions. The virus “crosses the placenta and causes microcephaly by targeting cortical progenitor cells, inducing cell death by apoptosis and autophagy, and impairing neurodevelopment,” note Patricia C. B. Beltrão-Braga of the University of São Paulo in São Paulo, Brazil, and her collaborators there, at the University of California, San Diego, and elsewhere. Similarly, early in pregnancy, the Zika virus infects the placenta and fetal brain of mice, causing a syndrome that resembles what happens in Zika-infected pregnant women, according to Michael Diamond of Washington University School of Medicine in St. Louis, Mo., and his collaborators.

On the Zika diagnostics front, Food and Drug Administration (FDA) officials in April issued an emergency use authorization to Quest Diagnostics of Madison, N.J., for its PCR-based test for Zika virus. That test, developed by Quest subsidiary Focus Diagnostics, detects viral RNA in human serum specimens. Separately, an experimental paper-based test rapidly detects Zika-specific RNA sequences within the viral genome, according to James Collins of Massachusetts Institute of Technology in Cambridge, Mass., and collaborators there and at nearby Harvard University. With amplification, the test can detect viral RNA concentrations as low as 2 or 3 parts per quadrillion in serum samples from monkeys infected with Zika virus, these researchers report.

Meanwhile, in May, CDC officials broadened their interim guidance for Zika virus testing, recommending that public health laboratories extend such testing to urine specimens from patients suspected to be infected by the virus, while continuing to test for Zika virus in serum samples. Moreover, for instances where PCR test results are negative, IgM-antibody testing should be done to cover those cases where reduced viremia might account for false-negative results, CDC officials note.

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NEW FROM ASM

Point-of-Care Workable in Developing Countries: HPV in Self-Collected Specimens

David C. Holzman

Point-of-care testing appears workable even under highly difficult circumstances—specifically, when evaluated among women in Papua New Guinea, who are at risk for becoming infected with human papillomavirus, a cause of cervical cancer, according to Andrew Vallely of the University of New South Wales in Sydney, Australia, and his collaborators. Moreover, self-sampling by these women provides specimens that screen as accurately as do cervical samples that clinicians obtained, these investigators note. They call this finding “critical” for developing same-day, screening-and-treatment procedures for women in this and other developing