A recent colloquium report from the American Academy of Microbiology (AAM), “Viruses throughout Life & Time: Friends, Foes, Change Agents,” paints a nuanced picture of viruses, explaining that they are far more than mere agents of disease. “Viruses participate in essential Earth processes and influence all life forms on the planet, from contributing to biogeochemical cycles, shaping the atmospheric composition, and driving major speciation events,” says Marilyn Roossinck of Pennsylvania State University, a member of the steering committee that helped to organize the colloquium. “It is very important to understand the real world of viruses, as this can inform our basic understanding of life and its origins, as well as major Earth phenomena like carbon cycling.”

The report, which was released in July, is based on the deliberation of experts who met in San Francisco, Calif., a year earlier (see: http://academy.asm.org/images/stories/documents/Viral_World_Report.pdf).
[I introduced] legislation that calls on the international community and all nations to immediately provide additional resources and services to develop the capacity of affected nations to address current and future public health crises.

Tom Frieden, Director, CDC: To stop an Ebola outbreak, we must focus on three core activities: find active cases, respond appropriately, and prevent future cases. The use of real-time diagnostics is extremely important to identify new cases. We must support the strengthening of health systems and assist in training health care providers. Once active cases have been identified, we must support patient care in treatment centers, prevent further transmission through proper infection control practices, and protect health care workers. Epidemiologists must identify contacts of infected patients and follow up with them every day for 21 days, initiating testing and isolation if symptoms emerge.

While we do know how to stop Ebola through meticulous case finding, isolation, and contact tracing, there is currently no cure or vaccine for Ebola. We need to strengthen the global response, which requires close collaboration with the WHO and additional assistance from our international partners.

Ariel Pablos-Mendez, USAID: The current total USAID funding dedicated to the Ebola response in West Africa is $14.55 million since March 2014, when the outbreak was first reported. In partnership with the WHO and UNICEF, we provided an initial $2.1 million to support the deployment of more than 30 technical experts, provide operational support for response efforts, including 35,000 sets of personal protective equipment and supplies and to distribute information on Ebola virus to the general public and health workers. This equipment provides critical protection for those working on the frontlines of pandemic outbreaks – preventing human exposure to highly pathogenic viruses and other emerging infectious diseases by limiting the risk of animal-to-human and human-to-human infections during outbreak investigations and response, human case detection and treatment, as well as other activities. The funding to the WHO builds on a $1 million annual investment that USAID has made since

the U.S. government, the governments of Liberia, Sierra Leone, and Guinea, and the great work Doctors Without Borders and the many health professionals from throughout the world who are doing everything they can to help people who have contracted this awful disease. It is in America’s and the world’s interest to assist in this crisis and continue to support nations as they work to develop and strengthen their health care systems. Health care is a human right, we must ensure that countries have the ability to address this outbreak and prevent future health epidemics from occurring.

MINITOPIC
New View on How Numbers of Endogenous Retroviruses Affect Cancer

Larger animals have edited out potential cancer-causing endogenous retroviruses (ERVs) from their genomes, possibly accounting for why such larger animals have lower rates of cancer than do smaller animals, according to Aris Katzourakis of Oxford University in Oxford, United Kingdom, and his collaborators. For example, mice have 3,331 ERVs, humans 348 ERVs, and dolphins only 55 ERVs, they find. “This is the first time that anyone has shown that having a large number of ERVs in your genome must be harmful — otherwise larger animals wouldn’t have evolved ways of limiting their numbers,” Katzourakis says. “As animals get bigger, the number of cells increases and there are more opportunities for things to go wrong, so there is an evolutionary pressure for larger animals to reduce the number of ERVs. We think this is linked to . . . how mammals have evolved to combat this risk.”

2009 to enable responses to priority pandemic prevention and response.

On August 4, the U.S. Ambassador to Liberia declared a disaster due to the effects of the Ebola outbreak. In response, USAID has activated a Disaster Assistance Response Team (DART). The DART, comprising team members in Monrovia, Liberia, and Conakry, Guinea, will coordinate planning, operations, logistics, administrative issues, and other critical areas of the interagency response. CDC will staff public health and medical response positions on the DART. This week, USAID announced an additional $12.45 million of Global Health and International Disaster Assistance funding to support efforts by CDC, the WHO, and NGOs to ramp up the Ebola response. USAID also has an additional 70,000 sets of personal protective equipment already in central and southern Africa that can be deployed to West Africa for use in the Ebola outbreak.

Ken Isaacs, Samaritan’s Purse, Boone, N.C.: Samaritan’s Purse is an international nongovernment organization with 38 years of experience dedicated to humanitarian relief. The Ebola outbreak has had a profound impact on our organization. We had hoped not to become involved in direct clinical care but as the disease resurged in June, we had no choice.

We believe the reported numbers only show 25–50% of the cases. The ministries of Health in Guinea, Liberia, and Sierra Leone do not have the capacity to handle these crises. If a mechanism is not found to create an acceptable paradigm for the international community to become directly involved, then the world will be relegating the containment of this disease that threatens Africa and other countries to three of the poorest nations in the world.

Samaritan’s Purse and [Doctors Without Borders] continue to be the two primary caregivers. . . That the world would allow two relief agencies to shoulder this burden along with overwhelmed Ministries of Health in these countries testifies to the lack of serious attention the epidemic was given.

The global impact of Ebola has yet to be fully realized. In the developing world, it has the potential to destabilize entire countries while creating widespread and even regional insecurity. It will have a devastating effect on transportation hubs, economies, health care systems, and governments.

Jeffrey L. Fox is the Microbe Current Topics and Features Editor.

NEW IN ASM JOURNALS

**E. coli More Adept at Resisting Radiation Than Was Thought**

David C. Holzman

*Escherichia coli* cells carry 46 genes—many previously unrecognized—that enable it to withstand exceptionally high levels of ionizing radiation, according to Michael M. Cox of the University of Wisconsin and his collaborators. These bacteria thus encode “new pathways of cellular self-repair, including DNA pathways that [if present] in humans may help protect us from cancer,” he says. Details appear in the July 2014 *Journal of Bacteriology* (doi:10.1128/JB.01589-14).

High doses of ionizing radiation can be deadly not only to humans, plants, and animals, but also to microbial cells. “Most of the damage occurs because ionizing radiation produces reactive oxygen species in water, and these molecules cause oxidative damage to anything—cellular proteins, DNA, membranes—that they come in contact with,” Cox says.

Nonetheless, some types of bacteria, notably *Deinococcus radiodurans*, are highly resistant to high levels of radiation. *E. coli*, which is not known for its resistance to radiation, can adapt to it under special circumstances, according to Cox and collaborators. They developed resistant strains via directed evolution, subjecting cells of *E. coli* to 20 cycles of gradually increasing levels of radiation—enough to kill 99% of the bacteria at each round—and harvesting the successive survivors.

“In a nutshell, three genes account for most of the new phenotype,” says Cox. However, other genes contribute to that phenotype, too, he adds. “Presumably, there were genes that were not altered in the evolution experiment, but yet were still critical to recovery from the damage inflicted by radiation. The new work is a screen to identify those genes.” Among the 46 genes, “nearly...