

## Biosafety Tips

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Biosafety Tips brings you practical approaches to biosafety or “news you can use.” If you are looking for a useful and sensible solution to a biocontainment problem, or perhaps a reference to help convince a skeptical researcher of the need for caution, this is the place to look. In this column, I share biosafety insights for managing a variety of workplace situations. I welcome feedback and suggestions for future topics. Please e-mail any comments or suggestions to karen\_byers@dfci.harvard.edu or to Co-Editor Barbara Johnson at barbara\_johnson@verizon.net.

### A New Virus, A New Pathogen, A New Laboratory-acquired Infection?

Mimivirus was isolated from water samples taken from a cooling tower in Bradford, UK, during the investigation of a 1992 pneumonia outbreak (La Scola et al., 2003). A description of this previously unknown DNA virus was first published in 2003. It is the largest virus known, and electron micrographs reveal an icosahedral structure. Mimivirus is larger than Mycoplasma and stains gram-positive; it was named “mimi” because it “mimics” a microbe. This virus is found inside an amoeba, *Acanthamoeba polyphaga*, and cannot be filtered out of media with a 0.2 micron filter (La Scola et al., 2005). Currently, research into the cause of pneumonia focuses on various microbes, including Legionella sp, which resist phagocytosis by amoebas. Both are found in aerosolized water associated with pneumonia infections. This is an important research focus since pneumonia is the leading cause of death from infectious disease, but the cause is unknown in 20%-50% of the cases (La Scola et al., 2005).

In 2005, a Mimivirus seroprevalence study was reported in *Emerging Infectious Diseases* (La Scola, 2005). The serum from 511 healthy Canadians was tested and 12, or 2.3%, had a substantial titer to Mimivirus. In comparison, the 36 of the patients with community-acquired pneumonia had positive serum titers (36, or 9.66%). When the charts were studied in detail, patients seropositive for Mimivirus were statistically more likely to be patients sent to the hospital from a nursing home or patients re-admitted to the hospital due to unsuccessful treatment with antibiotics. Patients seropositive for Mimivirus were also more likely to be older or to have diabetes mellitus; however, that correlation was not statistically significant.

Mimivirus DNA was isolated from a bronchoalveolar lavage specimen taken from a comatose patient who had two episodes of hospital-acquired pneumonia. However,

the authors point out that it is not possible to distinguish between colonization and infection. In light of Koch’s postulates, the authors state: “As we do not report direct evidence of infection by Mimivirus, these results have to be interpreted with caution” (La Scola et al., 2005).

More evidence for Mimivirus pathogenicity was reported by Raoult in 2006. The 28-year-old laboratory technician who performed Western blots to confirm infection in patient samples developed a dry cough. After 15 days, he developed a fever, chills, weakness, and a productive cough and sought medical attention. Antibiotic therapy was initiated and after 23 days, he required medical attention again because his symptoms had not improved and he had developed chest pain. An x-ray showed bilateral basilar infiltrates in the lung, suggesting viral pneumonia (Raoult, 2006).

Annually, this technician was tested to determine if he had developed antibodies against microorganisms he manipulated in Western blot assays. He was seronegative for all usual pneumonia-causing agents, but his Mimivirus antibody titer went from less than 1:50 before infection to 1:3200 on diagnosis. Electrophoresis confirmed strong reactions to Mimivirus proteins; the serum from a few months prior to infection showed no reaction.

### Risk Assessment for Mimivirus

In reporting the laboratory-acquired infection, the authors have responsibly pointed out an error in their initial risk assessment. Because the pathogenicity of Mimivirus had not been established, no specific (biosafety) procedures for manipulation of Mimivirus were in place. The report’s conclusion corrects the problem.

“The case presented here provides additional evidence that the mimivirus may be a cause of clinically important infection. The technician was exposed to the virus, developed pneumonia, and exhibited seroconversion to 23 different specific proteins—4 of which were encoded by very specific genes without homologue in the National Institutes of Health GenBank. Therefore, cross-reactions were unlikely. The inefficacy of antibiotic treatment and the negative results of tests performed on other antigens reinforced our opinion. Serologic seroconversion does not establish causality; therefore, further isolation of mimivirus from an infected patient is now mandatory. However, we believe that the mimivirus should be considered a pneumonia agent and should be treated as a class 2 pathogen” (Raoult, 2006).

## References

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Mimivirus in pneumonia patients. *Emerging Infectious Diseases*, 11(3), 449-452. Available at: [www.cdc.gov/ncidod/EID/vol11no03/04-0583.htm](http://www.cdc.gov/ncidod/EID/vol11no03/04-0583.htm)

Raoult, D., Renesto, P., & Brouqui, P. (2006). Laboratory infection of a technician by mimivirus. *Annals of Internal Medicine*, 144(9), 702-703.

## Online Journal Submission Site

*Applied Biosafety: Journal of the American Biological Safety Association* is a peer-reviewed, scientific journal committed to promoting global biosafety awareness and best practices to prevent occupational exposures and adverse environmental impacts related to biohazardous releases. The goal of *Applied Biosafety* is to provide a forum to exchange and promote sound biosafety and biosecurity initiatives through the publication of new research in biosafety, as well as information on best biosafety practices, policy issues and position papers, editorials, commentaries, and reviews.

The new online submission site for *Applied Biosafety* is user-friendly and available at [www.x-cd.com/absa/article.cfm](http://www.x-cd.com/absa/article.cfm). If you have any questions, please contact the Production Editor, Karen Savage, at the ABSA Office at 1-866-425-1385 (toll free) or 847-949-1517 or via e-mail at [karen@absa.org](mailto:karen@absa.org).

## USDA, EPA, and FDA Statement on Genetically Engineered Corn “Event 32”

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The U.S. Department of Agriculture’s Animal and Plant Health Inspection Service (APHIS), the U.S. Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA) are coordinating efforts following notification by Dow AgroSciences that the company detected extremely low levels of an unregistered genetically engineered (GE) pesticide product known as a plant-incorporated protectant (PIP) in 3 of its commercial GE hybrid corn seed lines. The unregistered product produces proteins that are identical to a registered product. USDA, EPA, and FDA have concluded that there are no public health, food or feed safety concerns. Additionally, USDA and EPA have determined that the unregistered GE corn PIP poses no plant pest or environmental concerns.

The unregistered GE corn PIP, known as Event 32, was found in some Herculex® RW and Herculex® XTRA Rootworm Protection products. Seed containing low levels of the unregistered Event 32 was inadvertently sold to farmers by Dow’s affiliate Mycogen Seeds and planted in 2006 and 2007. EPA and USDA previously approved Herculex® Rootworm Protection products containing a closely related PIP, Event 22. These products are also approved for use in several foreign countries.

Through careful analysis, EPA determined that the introduced proteins produced by Event 32 are identical to those approved for Event 22, and therefore they are covered by an existing tolerance exemption (EPA food safety clearance). FDA has concluded there are no food or feed safety concerns because EPA has determined that the introduced proteins in Event 32 are safe and because corn containing Event 32 is present in food or feed, if at all, only at low levels. In addition, APHIS’ scientific analysis concluded that Event 32 poses no plant pest or environmental concerns.

The 2008 U.S. corn crop will not be affected. APHIS took steps to ensure Dow recalled all affected seed that was shipped to dealers for the 2008 planting season. APHIS and EPA are coordinating on the investigation of potential violations under their respective regulatory acts.

Corn Event 32 was found at extremely low levels—approximately 3 seeds per 1,000—in affected Herculex seed products. Dow reported that in 2007 approximately 53,000 acres of the affected products were planted in the United States. Total U.S. corn acreage in 2007 was more than 93 million acres. Taking into account, the low levels of Event 32 in the Herculex seed products as well as the very small proportion of these seeds that were planted, any amount of Event 32 in harvested corn would be negligible. It is estimated that no more than 0.0002 percent (two ten-thousandths of one percent) of the 2007 corn crop may have contained Event 32.

For more information on the respective roles of USDA APHIS, EPA, and FDA in the federal regulation of GE plants, see the United States Agencies Unified Biotechnology web site at: <http://usbiotechreg.nbii.gov/>.

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