

Brazilian Vaccinia Viruses and Their Origins

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[Ted Pistorius] Hello, I'm Ted Pistorius, speaking today with Dr. Inger Damon, Acting Branch Chief of the Poxvirus and Rabies Branch here at CDC. We're discussing an article in the July 2007 issue of *Emerging Infectious Diseases* about the history and extent of vaccinia virus infection in Brazil. So Inger, what are vaccinia viruses?

[Inger Damon] Vaccinia viruses are a part of the orthopoxvirus genus, the same genus as variola virus, which causes smallpox. In fact, live vaccinia virus was used in vaccinations for smallpox, which the World Health Organization declared in 1980 had been eradicated. Other viruses in this genus, including vaccinia, but also monkeypox and cowpox, continue to cause outbreaks of human illness. In our article, we looked at the recognition of vaccinia virus outbreaks in Brazil and their public health importance.

[Ted Pistorius] So what makes these viruses important?

[Inger Damon] These viruses are causing both human and animal disease. Although there have been no human deaths, there is associated illness, and the effect on milk production in cows is reported to be of significant agricultural economic concern.

[Ted Pistorius] So besides cows, what other species can be infected with vaccinia viruses?

[Inger Damon] Well, actually, poxviruses are really interesting because they're found in just about all vertebrate animal species that have been thoroughly examined. Vaccinia viruses and close relatives seem to have a broad host range within various species of mammals and can infect a spectrum of mammalian species running from rodents to cows. Whole genome sequencing of Brazilian vaccinia virus is ongoing at CDC, and we hope it'll help clarify the relationship between these viruses and their hosts. These studies will help us to understand the ways in which the hosts may have shaped the evolution of these viruses.

[Ted Pistorius] That's interesting. So what new insights can be found in this study?

[Inger Damon] Well, during the smallpox eradication campaign, it was not a pressing concern that the vaccinia virus used in human vaccines could establish itself in nature. The observations reported in our article could be understood in a number of different ways. One explanation is that the vaccinia viruses used as human smallpox vaccines have managed to establish themselves in the domestic and wild animal populations in regions of Brazil, are now infecting humans, and are more severely affecting humans that didn't receive smallpox vaccines before the program ended. Our observations are also going to help contribute to studies about the origins and the emergence of vaccinia virus, since the historic origins of vaccinia virus are not currently understood.

Regardless, the recognition of vaccinia virus as an animal and human pathogen in Brazil and other parts of the world is important as we consider the possibility of renewed widespread use of smallpox vaccine, which could be needed in the future as the result of bioterrorism. There's certainly a need to reinforce guidance about safe handling and disposal of materials concerning vaccinia virus.

[Ted Pistorius] Let me make sure I've got this straight. By using vaccinia viruses to vaccinate people against smallpox before it was eradicated, we ran the risk of creating new infections in animal populations. So now you're studying this in Brazil to see if there are indeed new vaccinia viruses that are infecting humans?

[Inger Damon] Correct, Ted, and we're doing this with our Brazilian collaborators to inform future vaccinia virus use and to reinforce existent guidance.

[Ted Pistorius] Inger, thanks for your comments, and we appreciate your perspective about these findings.

Our discussion with Dr. Damon was prompted by an article on Brazilian vaccinia viruses and their origins, published in the July 2007 issue of *Emerging Infectious Diseases*. This article, and others on emerging bacterial and viral diseases, can be read online at cdc.gov/eid.

You can submit your comments on this interview to eideditor@cdc.gov. That's eideditor, one word, at cdc.gov.

For *Emerging Infectious Diseases*, I'm Ted Pistorius.

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