

# Wild chimpanzees get AIDS-like illness

Finding challenges long-held assumption.

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Some chimps in Gombe National Park have been succumbing to an AIDS-like disease. *Michael L. Wilson*

Researchers have overturned a decade-old consensus that chimpanzees cannot fall ill as a result of infection with a virus similar to HIV.

Previously, scientists had thought that chimpanzees were like other non-human primates that can become infected with simian immunodeficiency virus (SIV) —

which is closely related to HIV — but do not go on to be seriously sickened by the virus.

The results suggest that it will not be possible to find the key to HIV immunity in the chimpanzee genome, as scientists had hoped. However, the study, published in *Nature*, sets the stage for researchers to gain insight into how HIV and SIV cause disease in their hosts by studying the responses of different primates to the viruses. Wild monkeys that have coexisted with SIV for a long time — such as sooty mangabeys and African green monkeys — seem to have evolved the ability to control SIV, and so do not become ill when exposed to the virus. The new paper, however, shows that chimpanzees — which, like humans, were exposed to SIV more recently — are sickened by the virus<sup>1</sup>.

Daniel Douek of the US National Institute of Allergy and Infectious Diseases in Bethesda, Maryland, calls the new study "a tour de force in tenacity considering the extraordinary challenges that presented in obtaining these data".

"From an evolutionary and epidemiological point of view, these data can be regarded as a 'missing link' in the history of the HIV pandemic," adds Douek, who was not involved in the research.

## Overturning assumptions

Beatrice Hahn, the scientist at the University of Alabama at Birmingham who led the work, says there was scant evidence to support the idea that chimpanzees don't fall ill as a result of SIV infection. "Really, we were making the assumption on very little data. I guess it's the arrogance of humans thinking all monkeys are the same."

That assumption began to unravel when Hahn's team started studying chimpanzees at Gombe National Park in Tanzania, where pioneering researcher Jane Goodall — a co-author of the new paper — began studying chimpanzee behaviour in the 1960s. Hahn's team developed urine and faecal tests to identify each chimpanzee and to test whether he or she had contracted SIV. The researchers found that 9–18% of the animals in Gombe were infected with the virus over the course of the study.

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*US National Institute of Allergy and Infectious Diseases*

During the nine-year study, the scientists found that adult SIV-infected animals were 10–16 times more likely to die than uninfected animals, and that all infants with the virus died.

Then, the team noticed that one female died within three years of contracting SIV and showing symptoms, such as weakness and listlessness, that seemed to mimic human AIDS. When she was autopsied, her body showed evidence of wasting and was wracked by parasitic infections, and her immune cells were severely depleted — signs that also resembled those of human AIDS.

The team then compared tissue samples from other animals that had died with and without SIV. They found that SIV-infected animals had abnormally low levels of a specific type of immune cell — the CD4 T cell — the same cell type that HIV targets and destroys. Taken together, the findings suggest that SIV has serious, AIDS-like effects on chimpanzees, the team concludes.

### **Uncaging research**

Viral immunologist Don Sodora of the Seattle Biomedical Research Institute at the University of Washington points out that the new finding means that scientists can study how SIV affects many different primates, including monkeys that never become ill from SIV; chimpanzees that contract what looks like an AIDS-like disease; and rhesus macaques, which are not natural hosts for SIV and get an AIDS-like disease from it.

"Having this gradient of disease progression increases the likelihood that investigations of SIV infections of non-human primates will yield important insights into how SIV and HIV cause disease in different host species," Sodora says. That could aid the development of treatments and vaccines, he adds.

But Hahn does not think the finding should reverse the movement to stop invasive research on chimpanzees. Chimpanzees were infected with HIV for research in the late 1980s and early 1990s, but in 1995, the US National Institutes of Health

stopped paying for researchers to breed new chimpanzees for use in research — a decision that some researchers have criticized.

Hahn says more can be learned from studying chimpanzees that live in sanctuaries and have naturally become infected with SIV than from studying artificially infected animals.

"The guys in Gombe have really taught me a lesson," she says. "These animals differ from us by 2% of the genome. They think and have societies. Rather than shooting them up with SIV, one should be more creative and find ways and means of answering the question without doing harm to chimpanzees."

- **References**

1. Keele, B. F. *et al.* *Nature* 460, 515-519 (2009).