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HIV

SIV emerges to cause AIDS in African monkeys

We are still struggling to understand how simian immunodeficiency virus (SIV), which is non-pathogenic in African non-human primates (NHPs), emerged in the human population after centuries of exposure to humans, and adapted to yield HIV-1, the root cause of the worldwide AIDS pandemic. A retrospective study recently published in the *Journal of Virology* shows that SIV can also cause AIDS after cross-species transmission among African NHPs.

SIVs crossed from chimpanzees and sooty mangabeys (SM) to humans in Africa and adapted to yield HIV-1, the source of the current devastating AIDS pandemic, and HIV-2, which causes an immunosuppressive disease. The cross-species transmission of SIVs yielded three HIV-1 groups, but only one of these caused the AIDS pandemic.

To evaluate the factors that affect the different outcomes of cross-species transmission, researchers at the Tulane National Primate Research Center examined samples from a group of three black mangabeys (BkM) that were infected with SIVsm from SMs in 1990, after experiments that were originally designed to establish a monkey leprosy model. A *Mycobacterium leprae* inoculum that was passaged through four SM monkeys was inoculated into the three BkMs. This strategy failed to cause leprosy in these monkeys but instead led to symptoms of AIDS in one of the three recipient BkMs.

Apetrei *et al.* show that, rather than selecting for a pathogenic viral variant by serial passage of the tissue containing *M. leprae*, AIDS was caused by the cross-species transmission of the wild-type SIVsm from an SM to a BkM. All three recipient BkMs were infected with SIVsm, but two animals remained unaffected by the infection whilst a third developed AIDS, characterized by weight loss, chronic diarrhoea and giant cell disease. So, SIV has pathogenic potential in African NHPs after all.

How did two of the monkeys control SIVsm infection? Sequencing of viruses indicated that all the monkeys were infected with similar SIVsm viruses, precluding the possiblity of variation in the inocula. Outcomes of cross-species infection are therefore unpredictable.

Black mangabey. Image courtesy of Cristian Apetrei.

Variant SIVs infect more than 35 NHP hosts in Africa, so understanding cross-species transmission is fundamental to assess the risk that this reservoir of SIV poses to human health.

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References and links

ORIGINAL RESEARCH PAPER Apetrei, C. *et al*. Direct inoculation of simian immunodeficiency virus from sooty mangabeys in black mangabeys (*Lophocebus aterrimus*): first evidence of AIDS in a heterologous African species and different pathologic outcomes of experimental infection. *J. Virol*. **78**, 11506–11518 (2004).