

 VIRAL PATHOGENESIS

# SIV gives the virome a boost

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Simian immunodeficiency virus (SIV) infection of a non-natural host, such as rhesus monkeys, is used as a model for HIV-1 infection because it progresses to an AIDS-like illness, an effect not observed following infection of natural hosts, such as African green monkeys. Such pathogenic SIV infection is associated with breakdown of the intestinal epithelial lining and enteropathy, and Virgin and colleagues now reveal that this is linked to expansion of the enteric virome.

The authors used next-generation sequencing to characterize the

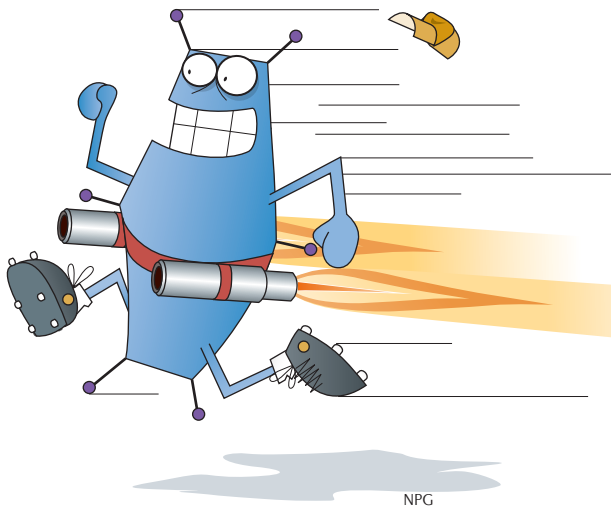
changes in the gut microbiome and virome (defined here as the metagenome of viruses that infect eukaryotic cells) of SIV-infected rhesus monkeys. Consistent with previous observations, the gut microbiomes of SIV-infected and uninfected rhesus monkeys were comparable. However, pathogenic SIV infection was associated with a significant expansion of the enteric virome, an effect that was not observed with non-pathogenic SIV infection of African green monkeys. When characterizing this expanded enteric virome, the authors identified at least 32 previously undescribed viruses, including five adenoviruses, two parvoviruses and one papillomavirus. PCR analysis and culture of faecal samples confirmed the presence of this broad range of viruses in SIV-infected rhesus monkeys.

But what is the clinical relevance of this expanded virome in pathogenic infection? Post-mortem examination of the intestines of SIV-infected rhesus monkeys revealed that in some cases the enteropathy was associated with

adenovirus infection. Moreover, PCR analysis showed that some viruses — for example, parvoviruses — detected by next-generation sequencing in the animals' faecal material were also present in the serum. This indicates that enteric viruses in SIV-infected rhesus monkeys can cross the epithelial barrier and enter the circulation, possibly contributing to disease.

The authors propose that the immunocompromised state triggered by pathogenic lentivirus infection allows the expansion of enteric viruses, which cause damage to the intestinal epithelial lining. This allows the viruses themselves to enter the circulation, but might also facilitate the translocation of bacterial products, and together these events could promote systemic immune activation as well as progression to AIDS.

Rachel David



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**ORIGINAL RESEARCH PAPER** Handley, S. A. et al. Pathogenic simian immunodeficiency virus infection is associated with expansion of the enteric virome. *Cell* **151**, 253–266 (2012)

**FURTHER READING** Sandler, N. G. & Douek, D. C. Microbial translocation in HIV infection: causes, consequences and treatment opportunities. *Nature Rev. Microbiol.* **10**, 655–666 (2012)