> Importantly, incubation of these platelets with a reporter cell line showed that the virus was replication competent

whether platelets also harbour HIV in infected people.

They isolated platelets from people treated with antiretroviral therapy, 15 of which had a detectable viral load in blood, whereas in 27 people the viral load was below the detection limit. 10 of the 27 people with suppressed viral load had detectable HIV RNA in their platelets with around ten copies per million platelets, which was more than ten-times lower than the copy number in platelets from the other group of people with the detectable viral load. Labelling and fluorescence assays confirmed that viral RNA and p24, a capsid component, were present in platelets, suggesting that they contain intact virions. Megakaryocytes also contained HIV, making them the likely origin of the platelet-associated virus.

Importantly, incubation of these platelets with a reporter cell line showed that the virus was replication competent. Platelets were able to transfer virus to macrophages after phagocytosis, a process that happens during platelet clearance. The macrophages contained integrated HIV DNA and produced infectious virus.

Finally, the people with HIV-containing platelets had lower $CD4^+$ T cell counts than those with HIV-negative platelets, which suggests a link to disease progression.

In summary, this study shows that platelets harbour replication-competent HIV and as such can perpetuate infection.

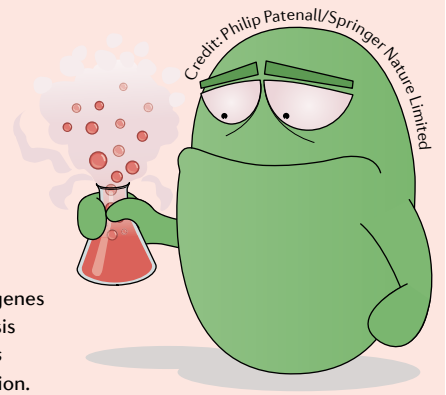
Ursula Hofer

ORIGINAL ARTICLE Real, F. et al. Platelets from HIV-infected individuals on antiretroviral drug therapy with poor $CD4^+$ T cell recovery can harbor replication-competent HIV despite viral suppression. *Sci. Transl Med.* **12**, eaat6263 (2020)

laying. The authors suggest that the sensing of geosmin and 2-MIB guides springtails to bacteria as a source of food.

To understand the importance of the VOCs to the bacteria, the authors investigated expression of geosmin and 2-MIB biosynthetic genes during the *Streptomyces* developmental life cycle. In transcriptome analyses, genes for geosmin and 2-MIB biosynthesis were upregulated in *Streptomyces venezuelae* at the time of sporulation. These genes are directly controlled by sporulation-specific transcription factors, limiting geosmin and 2-MIB emission to sporulating colonies. Remarkably, the number of spores dispersed and the dispersal distance were positively affected by production of VOCs in *S. coelicolor*.

The authors hypothesized that VOC-mediated attraction of springtails and the coupling of geosmin and 2-MIB biosynthesis to sporulation enables springtails to act as vectors for spore dispersal. Notably, substantial numbers of *S. coelicolor* were detected on the hydrophobic surface



of *F. candida*, and the spores were also found to survive transit through the springtail gut, suggesting that they are vectors.

Altogether, these results suggest that VOCs have a central role in the life cycle of *Streptomyces* species through facilitating the dispersal of spores by soil springtails.

Ashley York

ORIGINAL ARTICLE Becher, P. G. et al. Developmentally regulated volatiles geosmin and 2-methylisoborneol attract a soil arthropod to *Streptomyces* bacteria promoting spore dispersal. *Nat. Microbiol.* https://doi.org/10.1038/s41564-020-0697-x (2020)

IN BRIEF

MICROBIOME

Prophages are gut virome pioneers

After birth, our gut bacterial microbiome is rapidly acquired, but less is known about early life dynamics of the gut virome. Now, Liang et al. find that assembly of gut viral communities occurs in distinct steps. They analysed meconium and stool from healthy neonates sampled in the first few days postpartum and at 1 and 4 months of life. Few or no viral particles were detected in the first days of life, but by one month 10^9 viruses per gram of sample were detected. Using shotgun metagenomics of virus-enriched samples and the gut microbiome followed by targeted microbiological analyses, the authors investigated the origin of viral communities in the human gut. The data suggest that very early in life, bacteria rapidly colonize the gut, and by 1 month prophages harboured by these bacteria are induced, leading to a gut virome dominated by phages. By 4 months, human viruses were detected. Remarkably, phage and human virus populations were modulated by breastfeeding.

ORIGINAL ARTICLE Liang, G. et al. The stepwise assembly of the neonatal virome is modulated by breastfeeding. *Nature* https://doi.org/10.1038/s41586-020-2192-1 (2020)

BACTERIAL PATHOGENESIS

Exfoliating *Neisseria gonorrhoeae*

Many pathogenic bacteria suppress epithelial exfoliation (rapid shedding of cells) to enhance host colonization. Common to these pathogens is their ability to bind carcinoembryonic antigen-related cell adhesion molecules (*CEACAMs*). *Neisseria gonorrhoeae* binding to CEACAM upregulates the expression of *CD105*, which is necessary to suppress exfoliation. Muenzner and Hauck find that CEACAM engagement by *N. gonorrhoeae* in mice leads to the release of nitric oxide (NO) by the bacteria, which initiates a protein kinase G-dependent signalling cascade in the host that upregulates *CD105* expression, leading to suppression of exfoliation. Blockade of this pathway led to the re-establishment of exfoliation, which inhibited *N. gonorrhoeae* vaginal colonization in mice, suggesting that targeting this pathway could be a promising treatment strategy.

ORIGINAL ARTICLE Muenzner, P. & Hauck, C. R. *Neisseria gonorrhoeae* blocks epithelial exfoliation by nitric-oxide-mediated metabolic cross talk to promote colonization in mice. *Cell Host Microbe* https://doi.org/10.1016/j.chom.2020.03.010 (2020)

VIRAL INFECTION

Do 'special' viral reservoirs exist?

Certain animal groups (for example, bats and rodents) are hypothesized to disproportionately harbour and transmit viruses to humans, but whether so-called 'special reservoirs' exist is controversial. Mollentzea and Streicker performed an analysis of the literature to construct a dataset of virus–reservoir relationships comprising avian and mammalian reservoir hosts of 415 viruses and the incidence of human zoonotic infections. They found little evidence to support the notion that reservoir host affects the propensity for a virus to infect humans. Rather, the frequency of zoonotic human infections increases with the number of viruses found in each animal order, which is related to the number of species within each group. Their analysis suggests that certain ecological or intrinsic traits of animal groups are unlikely to increase the chance of a virus being a threat to humans.

ORIGINAL ARTICLE Mollentzea, N. & Streicker, D. G. Viral zoonotic risk is homogenous among taxonomic orders of mammalian and avian reservoir hosts. *Proc. Natl Acad. Sci. USA* https://doi.org/10.1073/pnas.1919176117 (2020)