

## IN BRIEF

 IMMUNOGENETICS**Bat immunology takes off**

Bats are reservoirs for many deadly viral infections, including Ebola and severe acute respiratory syndrome (SARS). However, bats themselves do not usually succumb to these infections. By describing the whole genomes of two distantly related bat species (*Pteropus alecto* and *Myotis davidii*), this study provides insight into why bats tolerate viruses that are deadly to humans. Comparing bat genomes with those of other mammalian species, the authors found that gene variants associated with DNA damage–repair responses and nuclear factor- $\kappa$ B (NF- $\kappa$ B) signalling have been positively selected for in bats. Bats are the only mammals capable of sustained flight, a process that requires high metabolic activity and leads to the generation of dangerous by-products such as reactive oxygen species. The authors propose that the evolution of flight led to the selection of genes that promote damage sensing and repair, many of which also contribute to antiviral immunity. They suggest that flight-associated adaptations inadvertently shaped the bat immune system.

**ORIGINAL RESEARCH PAPER** Zhang, G. *et al.* Comparative analysis of bat genomes provides insight into the evolution of flight and immunity. *Science* **339**, 456–460 (2013)

 REPRODUCTIVE IMMUNOLOGY**Hormonal support for regulatory T cells**

Pregnancy is associated with an early expansion of regulatory T ( $T_{\text{Reg}}$ ) cell populations, which promote fetal tolerance. Here, the authors describe a role for the pregnancy-associated hormone human chorionic gonadotrophin (HCG) in this process. Although mice do not produce HCG, they express a homologous hormone (LH) that signals via the same receptor as HCG. The authors found that the administration of HCG to mice increased the numbers and the suppressive capacity of their  $T_{\text{Reg}}$  cells. This was shown to be due to both direct effects of HCG on  $T_{\text{Reg}}$  cells and indirect effects of HCG on dendritic cells. Notably, treatment with HCG prevented fetal loss in abortion-prone mice. Interestingly, HCG has previously been suggested to improve pregnancy outcomes in patients undergoing *in vitro* fertilization (IVF) therapy. This study indicates that the positive effects of HCG in IVF might be due to the ability of this hormone to boost  $T_{\text{Reg}}$  cell activity.

**ORIGINAL RESEARCH PAPER** Schumacher, A. *et al.* Human chorionic gonadotropin as a central regulator of pregnancy immune tolerance. *J. Immunol.* 8 Feb 2013 (doi:10.4049/jimmunol.1202698)

 HIV**IL-7 in semen enhances HIV transmission**

This study looks at the role of semen in promoting HIV-1 transmission during vaginal intercourse beyond its role as a passive carrier of virus. Semen of all healthy men contains high concentrations of interleukin-7 (IL-7), and concentrations are increased further in HIV-1-infected individuals. The authors used an *ex vivo* model of HIV-1 infection of human cervico-vaginal and lymphoid (tonsillar) tissue to show that short periods of exposure to concentrations of IL-7 comparable to those found in the semen of HIV<sup>+</sup> men enhance subsequent HIV-1 replication by preventing the apoptosis and promoting the proliferation of CD4<sup>+</sup> T cells. This increases the size and lifespan of the founder pool of infected cells. The authors suggest that the concentration of IL-7 in semen could be a determinant of the efficacy of HIV-1 transmission to a female partner.

**ORIGINAL RESEARCH PAPER** Introini, A. *et al.* Interleukin-7 facilitates HIV-1 transmission to cervico-vaginal tissue *ex vivo*. *PLoS Pathog.* **9**, e1003148 (2013)