

DISEASE WATCH | IN THE NEWS

Mixed month for HIV

The past month provided mixed fortunes for the HIV research community, with news that the largest international trial to date of an HIV microbicide gel found no evidence of a reduction in the risk of infection for women. The trial was funded by the UK Department for International Development and the UK Medical Research Council and was carried out under the auspices of the Microbicide Development Programme, a not-for-profit partnership of 16 research institutions in Africa and Europe. Involving 9,385 women at 6 research centres in 4 African countries, the trial found that there was no significant difference in the risk of HIV infection between women who were supplied with the PRO 2000 gel and those who received a placebo gel. Participants were asked to use the gel before each sex act, and they were also given condoms and provided with safe sex counselling. Although the result is clearly disappointing, the trial had a major social science component that yielded new information about sexual behaviour and factors affecting condom use.

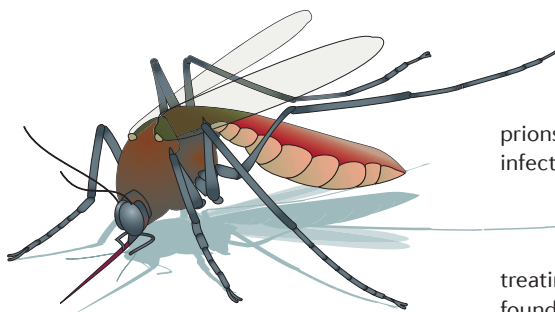
Better news for the HIV community came as the US Government officially lifted a 22-year-long immigration ban that prevented anyone with HIV/AIDS from entering the country. Originally imposed in the 1980s, the ban was recently described by President Obama as being “rooted in fear rather than fact”, and its lifting has been widely welcomed. **BBC**

Biocides drive antibiotic resistance

Resistance of microorganisms to the biocides used in detergents has been linked to an increase in resistance to certain antibiotics. One such biocide, benzalkonium chloride (BKC), is a nitrogen-based quaternary ammonium compound with broad-spectrum antimicrobial activity. Fleming and colleagues subjected *Pseudomonas aeruginosa* to increasing levels of BKC in a long-term continuous culture experiment and isolated eight *P. aeruginosa* strains that exhibited a stably inherited increase in the minimum inhibitory concentration for BKC. The authors tested one of these isolates (*P. aeruginosa* PA-29) for changes in antibiotic susceptibility and observed a

decrease in susceptibility to ciprofloxacin. *P. aeruginosa* PA-29 was found to contain a point mutation in the DNA gyrase subunit A gene, *gyrA*, as well as altered expression of certain components of the Mex efflux system, which together were likely to be responsible for the co-adaptation to ciprofloxacin. The use of inappropriately diluted detergents containing subinhibitory concentrations of biocides could therefore provide a selection pressure for the development of resistance to commonly used antibiotics, posing a potentially serious threat to individuals at risk of infection. **Microbiology**

Malaria transmission unplugged



More than 1 million people worldwide die each year as a consequence of infection with malaria parasites, making the development of effective treatment and prevention strategies imperative. Targeting the reproductive cycle of the *Anopheles gambiae* vector, which transmits the parasites to humans, is an attractive approach, but such work has been hampered by a limited understanding of mosquito mating behaviour. *A. gambiae* mosquitoes mate only once during their lifetime, and seminal secretions produced by the male accessory gland (MAG) form a coagulated mass of cross-linked proteins known as the mating plug, which is transferred to the female and was thought to act as a barrier to insemination by rival males. However, as Flaminia Catteruccia and colleagues now show, the mating plug is a key determinant of mating success that promotes sperm retention in the female mosquito. The authors found that the seminal proteins in the mating plug are cross-linked through the action of a MAG-specific transglutaminase (TGase) and that interfering with TGase expression inhibited plug formation and transfer and consequently decreased mating efficiency.

The mating plug may therefore be a useful target for sterilization approaches that aim to reduce the number of malaria-carrying mosquitoes. **PLoS Biol.**

Darwinian prion evolution?

Prions are infectious conformational variants of normal cellular proteins that are responsible for a range of neurodegenerative disorders. PrP^{Sc} is a misfolded conformer of the normal cellular prion protein (PrP^C), and it replicates by acting as a template to convert normally folded PrP^C. However, as a study published in *Science* now shows, prion propagation seems to be more complex than the simple template model suggests, with prions exhibiting hallmarks of

Darwinian evolution. Weissmann and colleagues found that during prolonged infection of PK1 cells the properties of brain-derived prions changed such that they became less infectious to R33 cells and exhibited an increasing sensitivity to the drug swainsonine. While attempting to cure prion-infected PK1 cells by treating them with swainsonine, the authors found that, following an initial decrease in the percentage of prion-infected cells (from 35% to 7%), the percentage of infected cells unexpectedly increased (to 25%), suggesting that the prions had developed swainsonine resistance. This resistance was reversible, and if swainsonine was removed the prions eventually became susceptible to the drug once again. These observations suggest that therapeutic strategies targeting the infectious form of prions may be hampered by selection for drug resistance. **Science**

Outbreak news

Anthrax. A contaminated batch of heroin is thought to be responsible for an outbreak of anthrax among drug users in Scotland. Six anthrax-linked cases have been confirmed so far, including three deaths. An investigation is under way to determine the source of the contamination, and heroin-injecting drug users are being urged to be alert and seek medical attention if they experience any symptoms of infection. **BBC**

In the News was compiled with the assistance of David Ojcius, University of California, Merced, USA. David's links to infectious disease news stories can be accessed on Connotea (<http://www.connotea.org>), under the username NatureRevMicrobiol.