

nature insight

AIDS



Cover illustration

Progeny HIV particles (red) emerging from an infected T lymphocyte (green) showing how many progeny can be generated in a single infected cell. (Image provided by D. Hockley/ NIBSC/SPL.)

The scale of the human immunodeficiency virus (HIV) epidemic is far greater than was predicted a decade ago. Already almost 20 million people have died of AIDS, over 30 million are currently living with HIV, and 16,000 new infections occur daily. It is clear that methods aimed at controlling the spread of the virus are failing to do so. Existing AIDS therapies are out of reach for most HIV-infected people in developing countries and, where available, they are limited by their toxicity and their cost. Furthermore, it is becoming increasingly apparent that current drugs are unable to purge the body of the virus and that discontinuation of triple therapy leads to a rapid rebound of plasma viraemia. Development of an effective HIV vaccine therefore remains one of the most pressing challenges facing modern medicine, and new types of drugs to treat already established disease are needed urgently.

In this month's *Nature Insight* we examine the biology of the virus and the disease it causes, give an overview on the current status of the AIDS pandemic, and review the efforts underway to control and curb it.

Robin Weiss introduces HIV on page 963 and discusses how the continuing epidemic could lead to a general increase in opportunistic infections. On page 968, Peter Piot and colleagues review the current AIDS global pandemic, covering the incidence and patterns of infection, the impact of disease on the socioeconomic make-up of affected countries, and potential strategies to control the rate of infection. On page 974, Mike McCune offers a comprehensive overview on the underlying causes for the progressive and relentless depletion of CD4⁺ T cells, summarizing competing viewpoints and proposing a model that might resolve the current debate of 'accelerated destruction' versus 'regenerative failure'. Andrew McMichael and Sarah Rowland-Jones continue on page 980 with a review on the mechanisms that account for the fact that cytotoxic T cells — although effective in short- or medium-term containment of the virus — are ultimately unable to control infection. On page 988, Stuart Lipton and colleagues review molecular pathways that give rise to neuronal injury and apoptosis in HIV-associated dementia. Douglas Richman reviews HIV chemotherapy on page 995. Although largely out of reach to the developed world, chemotherapy has transformed the face of AIDS in the developed world, but new anti-HIV compounds are needed urgently to combat emerging viral resistance and reduce the side effects associated with the toxicities of currently available drugs. Gary Nabel ends this collection of review articles with an overview on page 1002 on the scientific challenges facing HIV vaccine development and how those challenges are being met by a growing commitment of the research community.

We are pleased to acknowledge the financial support of Bristol-Myers Squibb in producing this Insight. As always, *Nature* carries the sole responsibility for all editorial content and peer-review. We hope that both general readers as well as experts in the field will find these articles useful and informative.

Ursula Weiss Senior Editor

Chris Surridge Insight Programme Editor
Liz Allen Publisher