SCIENCE

AIDS Research—1998

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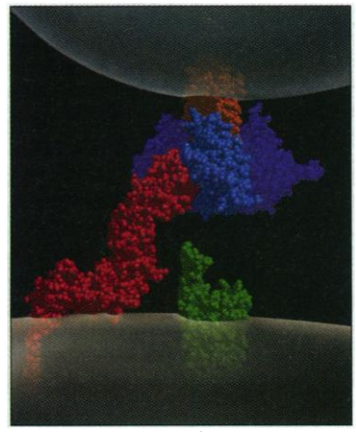
Periodically in the history of the AIDS epidemic it has been worthwhile to stand back and do a reality check. What do we really know? What do we need to add in research and resources? In this special issue, we examine these questions with various News stories, Articles, Viewpoints, and personal perspectives.

The News section focuses on Europe's contributions to AIDS research. With only a fraction of the resources available to their counterparts in the United States, European researchers have made, or been involved in, many key scientific breakthroughs. Despite these successes, reports *Science*'s Paris correspondent Michael Balter, budgets for AIDS research are being squeezed in much of Europe. (For additional discussion of AIDS research in France, see *Science*, 16 January, p. 312.) The News also looks at how the United Nations' special program on AIDS and its head, Peter Piot, are struggling with limited resources to stem the tide of the global epidemic. (See Piot's essay on the AIDS epidemic on p. 1844.)



In terms of the virus, major advances have been made in understanding, at the molecular level, how the viral envelope glycoproteins interact with host cell receptors (Wyatt and Sodroski, and see Rizzuto *et al.*, p. 1949) and how viral accessory proteins are used to optimize production and avoid immune recognition (Emerman and Malim).

As Varmus and Nathanson point out in their Editorial (p. 1815), the decreases in AIDS mortality in the United States are largely a scientific triumph of transmuting information about virus structure and replication into therapeutics. Side effects and virus resistance are clouds looming on the horizon, however, and treatment failure is a reality whose definition is much more complicated than merely finding resistant virus (Perrin and Telenti). Before resistance testing can be used clinically in designing individualized therapies, there are significant issues that must be addressed. As reviewed by Ho, eradication or long-term suppression of the virus may require immune-based strategies in addition to antiviral drugs. Pragmatically, tracking of the virus and analysis of viral reservoirs in the body will require better resources, which has led Cavert and Haase to propose the establishment of tissue banks from HIV-infected individuals.

There is a general consensus that control of the epidemic will depend on the development of an effective vaccine. Increased understanding of cellular immunity is beginning to shed light on the immune responses likely to be protective (Letvin). Although a variety of vaccines are being tested in animal and human studies, the field is still searching for the best strategies. One of the features that must be factored into all strategies for dealing with HIV is that the virus is changing constantly (Korber *et al.*). Studies of virus variation and evolution will continue to be needed to design the next generation of weapons against HIV.

For any individual, the best strategy is never to be exposed to the virus. However, promoting prevention is an extraordinarily complex issue, mired in societal norms and taboos. The reality is that prevention is possible. Phoolcharoen describes the history of the epidemic in Thailand, where a forthright campaign and a commitment through all levels of society to controlling sexual transmission have led to dramatic decreases in infection rates. Behavioral interventions have been demonstrated to be effective in the United States as well (The National Institute of Mental Health Multisite HIV Prevention Trial Group). However, there has been a dismal failure in the United States to take the politically unpalatable steps that would work (see the Research Commentary by Hein, p. 1905), and it is much too soon to exhibit complacency toward HIV.

–Barbara R. Jasny and Daniel Clery