We have taken advantage of unrelated studies (*4*) in which women were alloimmunized as a therapy for unexplained recurrent spontaneous abortions. Women with three or more unexplained miscarriages were immunized with peripheral blood lymphocytes from their husbands in a double-blind trial with autologous lymphocytes used as a placebo. While none of the control group developed antilymphocyte antibodies (ALAs), 85% of the alloimmunized women developed ALAs, and full-term pregnancy correlated with high amounts of ALA in their blood (*4*). There were no immediate or delayed side effects from the immunizations, no evidence of graft-versus-host reactions, and no production of autoreactive ALAs. In addition, sensitive Food and Drug Administration–approved HIV-1 antibody assays showed no evidence of reactivity with viral antigens, which might be expected on the basis of molecular mimicry by gp120 and earlier mouse experiments (*5*).

One out of 12 women who were successfully alloimmunized had an unusually high titer of ALA in her serum and also demonstrated the ability to neutralize the MN strain of HIV-1 in vitro (50% inhibition at a dilution of 1:300). The serum sample from this person was also particularly reactive with uninfected H9 cells, the cell line used to propagate the MN virus. The neutralization was unlikely to be explained by steric inhibition of viral attachment by the anticellular antibodies, because preincubation of antibody and target cells followed by washing resulted in no inhibition of a subsequent virus inoculum. In addition, the neutralization of free virus was complement dependent, which suggests direct virolysis. Finally, mixtures of an HIV^+ neutralizing serum sample and this alloantiserum showed largely additive neutralization, which suggests independent effects directed at both viral and nonviral target antigens present on the virion (*6*). A second patient, with an above-average amount of ALA in her blood, also showed a weak but significant neutralization titer (1:20).

These findings demonstrate that alloimmunization can be performed safely and can induce antibodies that neutralize HIV. However, the significance of these observations for vaccine development remains unclear because most of the alloimmunized women showed no neutralization of HIV-1. It is conceivable that there is significant ALA-mediated neutralization that is not detectable in this particular in vitro assay. Alternatively, cell-mediated responses to HLA might be the more important determinant of protection in vivo. In experiments with macaques, anticellular antibody titers were associated with protection but SIV neutralization was not (cell-mediated responses were not assessed) (*1*). It is also possible that critical neutralization-specific HLA epitopes, or the HLA-linked ability to recognize them (*7*), were present only in the two women with alloimmunizations that resulted in neutralization. Thus, additional studies are needed to determine the specific antigens involved and the relative contribution of humoral and cell-mediated responses.

Finally, Stott *et al.* observed only partial protection using cells alone (*8*), which suggests that immunization with both viral and cellular antigens may be necessary for efficient protection. The additive neutralization by ALA and antibodies against HIV that we observed also supports this concept. In addition, studies by Shearer and Clerici themselves have attributed "natural resistance" in high-risk seronegative individuals to HIV-specific cellular immune responses (assayed with the use of synthetic peptides that correspond to the HIV-1 envelope, excluding regions of known HLA homology) (*9*). Taken together, these observations may provide a stronger rationale for an AIDS vaccine that contains both cellular and viral antigens (for example, whole killed virus or fixed infected cells). The corresponding animal experiments, using allogeneic material for both vaccination and challenge, have not yet been reported and should provide additional insights into the utility of alloantigens in the formulation of a prophylactic AIDS vaccine. In the meantime, alloimmunized patients and high-risk seronegative individuals are the subjects of ongoing studies to determine which cellular antigens are targets for neutralizing antibody and to assess the antiviral effects of cellular responses to alloantigens.

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Astronomy: Of Fundamental Value

The assertions in the recent editorial "High-energy astrophysics" by David Lindley (7 Jan., p. 11) suggesting that astronomy is a "singularly useless endeavor" with no special claim to fundamentality, cannot

be allowed to pass without comment. Rather, the facts indicate the reverse. Recent results have demonstrated that the Earth is an asteroid-pelted planet (*1*), that evolution is a chaotic process (*2*), that impacts drive at least the major branch points of the evolutionary tree (*3*), and that their decrease through geologic time has allowed life to develop (*4*) and now presents a significant, potentially avoidable, hazard to civilization (*5*) with a statistically insurable risk estimated at several hundred million dollars per year. Applied astronomy (*6*) has a promising future—provided the comet or asteroid does not get us first. Whatever the merits of high-energy astronomy (and there are many), modern astronomy also addresses a wide range of issues that are clearly fundamental and of great value to society; the debate is not advanced by the propagation of myths or the collective burial of heads in the sand.

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Corrections and Clarifications

The title of the Report by S. Kandels-Lewis and B. Séraphin on page 2035 of the 24 December issue should have been "Involvement of U6 snRNA in 5′ splice site selection."

The map accompanying the Perspective "The deadly Latur earthquake" by H. K. Gupta (10 Dec., p. 1666) incorrectly designated a portion of eastern India as "Myanmar."

In the Research Article "The U5 and U6 small nuclear RNAs as active site components of the spliceosome" by E. J. Sontheimer and J. A. Steitz (24 Dec., p. 1989), figures 4A and 4B (p. 1992) were printed incorrectly. The correct figure is shown below.