AIDS in an African context

Clues to the origin of the virus that causes AIDS continue to emerge from studies of African viruses. But African countries have more pressing concerns.

SIR Fred Hoyle may hold the view that the AIDS (acquired immune deficiency syndrome) virus is of extraterrestrial origin, others may like to believe that it escaped from a germ-warfare laboratory (surely a better plot would involve an unscrupulous biotechnology company that made and released the virus but whose vaccine development department has been a failure), but in all likelihood the human AIDS virus is a descendant of a monkey virus. The link between the two may be the second type of AIDS virus, identified earlier this year in western Africa. That is one, but by no means the only, reason why there is an increasing interest in the study of AIDS in Africa.

The reason to believe that the second type of virus is a link between monkey viruses and HIV-1 (human immune deficiency virus type 1, otherwise acronymically termed HTLV-3, LAV or ARV) is that it is more closely related to the former than the latter, at least by relatively crude comparisons. But the situation is complicated by the isolation of two apparently different versions of the west African AIDS virus and of several apparently different monkey viruses.

On the evidence so far published, the two versions of the human virus are very similar in composition but only one causes AIDS. That one was isolated by Luc Montagnier's group from AIDS patients in Guinea Bissau and the Cape Verde Islands, and was named LAV-2 by them (Clavel, F. *et al. Science* **233,** 343–346; 1986). The group has since also isolated it from AIDS patients in neighbouring countries, renamed it HIV-2 and, as reported further on in this issue (Clavel, F. *et al. Nature* **324,** 691–695; 1986), molecularly cloned the virus. The other version of the virus has been found in nearby Senegal by Myron Essex's group and always in people without AIDS (Kanki, P.J. *et al. Science* **232,** 238–243; 1986). This virus is called HTLV-4.

Unfortunately, and largely because of the sorry state of affairs that exists between leading French and US AIDS researchers, there has been no direct comparison of HIV-2 and HTLV-4. Therefore it remains uncertain whether their obvious similarities betoken an identity — or rather a pseudoidentity, because, as Clavel *et al.* now report, different isolates of HIV-2 vary in much the same way as those of HIV-1. The more interesting possibility is that HTLV-4 differs from HIV-2 in some crucial way that accounts for its apparent lack of pathogenicity.

Whatever the relationship of HTLV-4 and HIV-2, both seem more closely related to monkey viruses than they are to HIV-1. With their molecularly cloned HIV-2, Clavel *et al.* now confirm that relationship in terms of the degree of hybridization between the nucleic acids of HIV-2 and the virus that is the cause of the AIDS-like disease of captive rhesus macaque monkeys. This virus, usually known as STLV-3_{mac} but now called SIV (unwisely without a species designation) by Clavel *et al.*, is related both to a virus in healthy captive sooty mangabey monkeys and to a virus in healthy wild African green monkeys. It is with the latter, called STLV-3_{agm} and now molecularly cloned (Hirsch, V. *et al Proc. natn. acad. Sci. U.S.A.* **83,** 9754–9758; 1986), that HTLV-4 has been compared and shown to be closely related. Hence the hypothesis that an apparently harmless monkey virus, STLV-3_{agm}, was the origin of an equally harmless human virus, HTLV-4, which evolved into the pathogenic HIV-2, the ancestor of HIV-1. Although this hypothesis is not without its problems, it also leads to some predictions that will be put to the test once all the viruses are cloned and sequenced. So far only HIV-1 is sequenced but the HIV-2 sequence is well on the way and the others should follow soon, if all goes well.

It is conceivable, at least, that this line of research will provide compelling evidence of an African origin of AIDS. Although that would not exactly be welcome news in Africa, at least the time is past when such a notion could lead to vehement denials, largely for fear of stigmatization and, it seems, loss of tourists. With a few exceptions, African countries are now frank about their AIDS problem, as well they might be given its scale.

Worst affected are central African countries, of which Kenya, Zaire and Uganda are the best studied. Reliable figures, which have been hard to come by, are summarized in two recent reviews (Quinn, T.C. *et al. Science* **234,** 955–963; 1986 and *AIDS and the Third World*; The Panos Institute*, 1986). As in developed nations, most of the data come from the major cities where the problem is at its greatest. The highest rates of infection are invariably in prostitutes, with figures ranging from 27 to 88 per cent. More alarming are the figures of 10–20 per cent from blood donors and antenatal clinics, as these are not high-risk groups in Western terms.

All the African figures have to be taken in context. Is, for example, the high rate of infection in blood donors typical of the population from which they are drawn or is it exaggerated by infection in the course of previous blood donations? Are the high rates of infection in general the result of other sexually transmitted diseases which, because of the genital ulcerations they cause, facilitate infection by the AIDS virus? And what rate of increase underlies these figures? Unfortunately there are few longitudinal studies of infection in Africa yet, although Quinn *et al.* boldly state that the present annual incidence of infection is approximately 0.75 per cent among the general population of central and east Africa. Nor are there many random population surveys; but a 6 per cent rate of infection recorded in a neighbourhood survey in Kinshasa, Zaire, is an indication of how serious the problem is.

More serious still is the fact that even the most simple means of limiting the spread of infection are not routinely used in most central African countries. It is estimated that between 1,000 and 1,500 new infections a year would be prevented in one major hospital alone in Zaire if there was routine screening of blood donors for HIV-1. Only a few million dollars would pay for routine blood screening throughout central Africa. But the cost per test would be somewhere between 3 and 30 times the average sum spent on an individual's health care in Africa. The prospects of routine testing seem poor without the help of foreign aid. To put the overall financial problem even more starkly, according to Quinn *et al.*, "the cost of caring for ten AIDS patients in the United States (approximately $450,000) is greater than the entire budget of a large hospital in Zaire, where up to 25 per cent of the pediatric and adult hospital admissions have HIV infection."

It is in this context that it is hardest to have much sympathy with some of the endless wranglings that go on concerning nomenclature of the viruses, with the neocolonial way in which some of the foreign interest in African AIDS is manifested, and with the lack of cooperation between rival groups when cooperation would further hasten understanding.

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