Medicine by John Grauerholz, M.D.

AIDS virus pool increases

The news means that more sophisticated techniques of microbial diagnosis must be brought on line as rapidly as possible.

At a recent scientific meeting in San Francisco, Luc Montagnier of the Pasteur Institute sounded the alarm about a new AIDS retrovirus, which he had discovered in AIDS patients from western Africa. The ominous feature of this new virus, which Montagnier has designated LAV-2, is that, unlike numerous other isolations of AIDS viruses (LAV/HTLV-III or HIV) from Africa which are not serologically or biologically distinguished from European or American AIDS viruses, the new virus is not detectable by present serological tests.

This announcement of a new, undetectable AIDS virus at a meeting of blood-bank personnel was not calculated to soothe those who were congratulating themselves on the defeat of Proposition 64 in California, especially since Montagnier stressed that there was no way this virus would remain confined to the African continent.

In April of this year, a group of scientists from Harvard School of Public Health, working with researchers from France and Senegal, reported evidence that a virus similar to one known to infect African green monkeys was infecting healthy people in Senegal, West Africa. Serum from these individuals reacted strongly with antigens of the monkey virus, known as STLV-III, but only weakly with antigens of HTLV-III/LAV, the AIDS virus.

This new virus was cultured and was shown to have retroviral-type particles, growth characteristics, and virus proteins similar to the STLV-III and HTLV-III/LAV type of retroviruses. The proteins were more closely related to those of the monkey virus than the human AIDS virus. Interestingly, this virus, designated HTLV-IV, has not been associated with the development of AIDS, or any other disease, so far.

On the other hand, the Pasteur Institute virus, LAV-2, was isolated from active AIDS cases which were seronegative for LAV/HTLV-III. These patients were both also from West Africa, one from Senegal and one from Guinea Bissau, and their sera also reacted strongly with an STLV-III virus which causes AIDS in a species of monkeys, "macaques."

To further complicate matters, there is now evidence of another cytotoxic (cell killing) retrovirus in South America. Evidence for this new virus was found by Dr. David Volsky and his colleagues at the University of Nebraska Pathology Department. In analyzing 1,100 blood samples from Venezuela, Dr. Volsky detected the presence of a retrovirus in 35 specimens. This virus is reactive to antisera against two proteins associated with HTLV-III/LAV, p42 and p51, but not to the rest of the proteins and glycoproteins associated with HTLV-III/LAV. In culture, the virus infects T-cells and ultimately kills them, but much more slowly than HTLV-III/LAV. All of the infected individuals live in remote areas of Venezuela, and a number are also infected with malaria.

Dr. Volsky is now trying to grow this virus in culture in order to be able to do genetic analysis and analyze its structural components. In addition, he has requested genetic probes for LAV-2 and HTLV-IV from the respective investigators, Montagnier and Essex, in order to see if his Venezuelan virus is related to one of these or is an entirely new virus.

What we are now seeing is the emergence of the "retrovirus pool" which Dr. Robert Gallo predicted at the Symposium on AIDS in Africa in November 1985 in Brussels, Belgium. It is now evident that animal retroviruses can infect man and, at least in some cases, produce disease. As the number of persons infected with these retroviruses increases, mixed infections and the recombinant products of these infections will also increase, resulting in an even larger selection of viruses.

This proliferation of different retroviruses will seriously impair the usefulness of antibody screening to detect infected individuals. In this circumstance, it is necessary that more sophisticated techniques of microbial diagnosis, such as those represented by Circular Intensity Differential Scattering (CIDS) or Multiparameter Light Scattering, be brought on line as rapidly as possible, before our present methodologies are overcome by the proliferation of multiple serotypes of retroviruses.

In addition to diagnostic capabilities, the development of such techniques of optical biophysics will enable researchers to finally elucidate the pathogenetic mechanisms by which the various AIDS viruses produce disease in the living host—pathogenetic mechanisms which, as the recent report of the National Academy of Sciences points out, are totally unknown at the present time. Development of these technologies within the necessary time frame will require a Biological Strategic Defense Initiative to complement the present Strategic Defense Initiative.