

AIDS initiative filed in California; research breakthrough announced

by John Grauerholz, M.D.

Two major developments, on the same day, at opposite ends of the United States, have created the potential for a major breakthrough against the Acquired Immune Deficiency Syndrome epidemic presently threatening to become the "Black Death" of the 20th century.

'PANIC' filed in California

In Los Angeles, on May 22, the Prevent AIDS Now Initiative Committee (PANIC), sponsors of the AIDS Initiative Statute, announced the filing of approximately 690,000 petition signatures, to qualify this statute for the November 1986 California general election. The signatures were gathered over a five-month period.

The AIDS Initiative Statute defines AIDS and the condition of being a carrier of the HTLV-III virus, by law, as "infectious and communicable," as they are in fact, and places this disease and this condition on the reportable diseases and conditions list. This list is already maintained by the California Department of Health Services, according to statute and contains virtually all dangerous communicable diseases and conditions in the state, such as German measles, typhus, tuberculosis, syphilis, plague, etc. Once AIDS and the condition of being an HTLV-III carrier are on this list, all those existing public-health statutes and codes that now apply to every other communicable disease, will also apply to AIDS and its carrier form.

This bill would mandate the application of existing, proven, traditional public-health measures to AIDS—laws and codes already on the books, laws and codes that have been applied day-in and day-out for years. These procedures are applied every day, throughout California, and in most other states, for at least 58 different communicable diseases.

The most prominent provisions of the existing health law that would now apply to AIDS are: 1) All cases of the disease must be reported. 2) Nobody infected with the virus may be present in a public or private school, whether as teacher, student, or employee. 3) Nobody with the virus may be involved in commercial food handling. 4) It is a serious misdemeanor to knowingly spread the disease. 5) The Department of Health Services has the power and obligation to test as much as may be necessary to halt the spread of the

disease, a power which Ken Kizer, head of the Department, has already requested. 6) The Department of Health Services has the power and obligation to apply measures of quarantine, as they deem necessary, to halt the spread of the disease. It should be stressed that the term "quarantine" means some restriction on activity, and is not synonymous with the term "strict isolation."

The impact of the filing of this petition will be enormous, precisely because the so-called "gay" community, which is heavily represented in California, has constituted one of the major obstacles to any serious public-health approach to this disease. The collection of these signatures over the last five months has demonstrated that the overwhelming majority of Californians are acutely aware of the enormous danger posed by the unchecked spread of this hideous epidemic, and are committed to the application of traditional public health measures to stop it.

New approach to AIDS vaccine

On the same day that the filing of the California petition was announced, scientists from the George Washington University Medical Center and the National Cancer Institute reported that they had successfully inhibited the AIDS-associated virus (HTLV-III/LAV) from invading human cells using antibodies against thymosin- α 1, a hormone of the thymus gland that stimulates immunity. Results of this study published in the latest issue of *Science* (May 30, 1986) suggest a new approach to making a vaccine against the AIDS virus.

Since the antibodies were raised against a chemically synthesized virus protein, rather than against a genetically engineered or inactivated virus, these findings may significantly reduce the time needed to develop an effective AIDS vaccine that could protect the general population against the spread of the AIDS virus.

Furthermore, the scientists believe they have identified the weak point in the armament of the AIDS virus which will provide a clue to a unique approach to making a vaccine. The study suggests that the anti-viral activity of the thymosin- α 1 antibodies is due to a chemical identity shared by the thymic hormone and a small region of the internal core of the AIDS

virus which is part of what is termed the "gag" protein.

This study is significant for three reasons:

1) It provides the first direct scientific evidence that it may be possible to develop an effective AIDS vaccine using a chemically synthesized peptide similar to the inner (core) region of the AIDS virus rather than the external (envelope) region. This inner core region is a highly conserved region which may in fact be common to a number of retroviruses more distantly related to the AIDS virus.

This discovery is important because a major obstacle to the development of an effective and protective AIDS vaccine is that many of the proteins in the envelope of the AIDS virus change rapidly—a process called genetic drift—so that a vaccine which is effective against one strain of the AIDS virus, may be totally ineffective against another strain. The attempts to develop an effective AIDS vaccine have thus far not dealt with the question of the many different strains of the HTLV-III/LAV viruses that are being isolated. This same type of problem has hampered development of an effective vaccine for the common cold for more than 25 years.

The problem of genetic drift may now be solved, since scientists in this study have demonstrated that a vaccine which raises antibodies against a peptide from the conserved inner (core) region, which is not as subject to genetic drift, may be more effective against AIDS viruses with variability in the envelope region.

These findings clearly demonstrate that neutralizing antibodies against the AIDS virus can be raised against a synthetic protein. Evaluations of antiviral activity of the resulting antibodies against the AIDS virus in animal model systems and humans are the next important steps. The scientists believe that such studies should receive the highest priority.

2) The study provides scientific evidence that neutralizing antibodies against the AIDS virus can be developed using a chemically synthesized protein which can be easily produced in large quantities, (i.e., thymosin- α 1 or small regions of the viral core protein) compared to the more expensive and complex methods for producing genetically engineered proteins.

3) The study also provides critical evidence for the involvement of the thymus gland in AIDS and suggest potential use of the thymus hormone itself. The extensive destruction of the thymus gland (the master gland of the immune system) in AIDS may potentiate the severe immune suppression following viral infection. Such severe immune depression has been seen in children with rare diseases, especially with the absence or malfunction of the thymus gland. Since the clinical symptoms of AIDS such as profound immune deficiency and increase in opportunistic infections are systemic and indistinguishable from symptoms seen in pediatric immune deficiencies associated with thymic dysfunction, a destruction of thymus function via AIDS virus infection is suggested by this study.

4) The ability to produce large quantities of specific neutralizing antibodies against the various AIDS viruses can lead to the near-term development of better tests for the presence of the AIDS virus. One of the drawbacks of the current tests, which measure the presence of antibodies to AIDS virus, and not the virus itself, is that they will not detect individuals who are carrying the virus but have not yet formed antibodies to it. These false negative carriers may represent a significant reservoir of undetectable carriers. However, by using labeled antibodies, one can test for the presence of the actual virus. The use of fluorescent antibodies, combined with high-speed flow cytometry, would provide the ability to rapidly screen large numbers of individuals with a high degree of specificity.

The principal scientists involved in the study are Prem S. Sarin, Ph.D., deputy chief of tumor biology branch, National Cancer Institute; his colleagues Daisy K. Sun and Arthur H. Thornton; Allan L. Goldstein, Ph.D., professor and chairman, department of biochemistry, The George Washington University Medical Center; and Paul H. Naylor, Ph.D., associate research professor of biochemistry, The George Washington University Medical Center.

In his remarks at the Washington press conference, Dr. Goldstein stressed that one of the major beneficiaries of this type of vaccine would be the asymptomatic carrier, the very person who would be the prime object of a mass screening program. Such a person, according to a recent Danish study, has essentially a 100% chance of ultimately developing a life-threatening disease as a result of his or her infection. Immunization with a vaccine capable of producing neutralizing antibodies would prevent the virus from reproducing and destroy existing virus, thus preventing the development of AIDS, and eliminating the carrier state.

Mass screening needed

When questioned about the need for mass screening of the population for AIDS, Dr. Goldstein said that such an approach was absolutely implicit in his work, and stressed the importance of the most rapid possible progress in developing a better AIDS test and moving toward vaccine development and clinical trials.

Funding is absolutely critical to the most rapid development of a vaccine and a screening program to locate those most in need of the vaccine. Ironically, Dr. Goldstein, who is perhaps the foremost authority on thymus hormones, and has large grants for studying these hormones in cancer and aging, has not received one cent from NIH for his work on AIDS, which was funded by a private venture which now holds a patent on the synthetic hormone that stimulates the production of the anti-AIDS antibodies. Perhaps the effect of this scientific breakthrough, combined with the political impact of the California PANIC, will finally shake loose the necessary funds to implement the crash mobilization that will be needed to stop the spread of AIDS.