UPDATE

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NCI ISOLATES AIDS VIRUS

Scientists at the National Cancer Institute (NCI) have strong evidence that variants of a human cancer virus are the primary cause of Acquired Immunodeficiency Syndrome (AIDS).

The discovery may make control of AIDS feasible by enabling development of both a simple test for detection of infected blood by blood banks and diagnostic laboratories and also a possible vaccine.

Dr. Robert C. Gallo, Jr., chief of the Laboratory of Tumor Cell Biology in NCI's Division of Cancer Treatment, who directed the research, reported isolation of the new group of viruses. They are variants of a family of viruses known as human T-cell leukemia/lymphoma virus (HTLV).

The scientists isolated the new viruses, named HTLV-III, from the helper T-cells of more than 50 patients with AIDS or pre-AIDS symptoms, and from some healthy individuals at risk of developing AIDS. About 90 percent of AIDS patients tested so far have high levels of antibody to the virus (an indicator of infection). Similar results have been found with patients with pre-AIDS, such as the lymphadenopathy syndrome. Normal people who are not at high risk of developing AIDS have very low levels or none.

Four papers published by Dr. Gallo and coworkers in the May 4 issue of Science document: the scientists' ability to isolate the HTLV-III viruses from infected persons; the development of a method for growing the viruses in T-cells in the laboratory in bulk amounts; the biochemical and immunological

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characterization of proteins and genes of the viruses; and the presence of viral antibodies in blood samples of infected people.

"Although this evidence does not prove absolutely that these viruses cause AIDS," said NCI director Dr. Vincent T. DeVita, Jr., "it is very strong evidence that we have isolated the causative agent. Short of preventing the disease with a vaccine, we may find no better proof."

The NCI effort was set up as a coordinated AIDS task force headed by Dr. Peter J. Fischinger, NCI associate director, with Drs. Gallo and Samuel Broder as the scientific and clinical directors, respectively, of this research. Scientists from other HHS agencies and the extramural community were regularly involved.

Dr. Gallo's laboratory together with clinicians and scientists from the NCI Immunology Branch, Memorial Sloan-Kettering Cancer Center, Duke University, the University of North Carolina, North Shore University Hospital on Long Island, Walter Reed Army Institute of Research in Washington, D. C., the University of Medicine and Dentistry of New Jersey in Newark, and New England Deaconess Hospital in Boston were able to isolate the HTLV-III viruses by finding human T-cells that grow well in the laboratory and are especially permissive for infection by these viruses. This discovery made possible the isolation of proteins made by the viruses from these cells. Enough viral protein was produced to test selected blood samples for the presence of antibody to the viruses. As a result, the scientists were able to devise a simple laboratory test that diagnoses the presence of HTLV-III antibodies in blood.

NCI scientists now predict that within six months it will be possible to have the amounts of viral protein needed for large-scale screening of blood samples by blood banks and diagnostic laboratories. Rapid tests for

antibodies to HTLV-III in human blood are already feasible. Scientists at the NCI Frederick Cancer Research Facility are collaborating with Dr. Gallo's group to develop procedures for large-scale production of these proteins.

NCI scientists also believe it will be possible to develop new ideas for treatment and a vaccine for AIDS.

NCI scientists are now exploring the detailed biochemical and immunological characteristics of the new HTLV-III viruses, which infect helper T-cells preferentially. Their lethal effect on T-cells is unusual for the HTLV viruses. Together with detectable differences in some of their proteins and genetic information, their ability to kill T-cells clearly separates these viruses from other members of the HTLV family.

The virus isolated by the NCI scientists is a member of a family of viruses called retroviruses, which have been studied extensively in animals. The genetic material in these viruses is ribonucleic acid (RNA). The retroviruses are named for their ability to convert RNA into deoxyribonucleic acid (DNA), the hereditary chemical comprising the genes of human and animal cells. In so doing, these viruses use the genetic machinery of the cells they infect to make the proteins they need for survival. In the process, many retroviruses can cause a variety of ailments in the animals, including depressed immune functions and cancer.

The first member of the HTLV family of viruses, HTLV-I, was isolated in 1978 and first published in 1980, also by Dr. Gallo and his coworkers. It has been reisolated many times since then in this country and abroad from a form of leukemia and lymphoma that affects mature T-cells. Extensive epidemiologic studies have linked HTLV-I to clusters of these cancers in certain parts of the world, particularly southern Japan, the Caribbean, and parts of South America and Africa. A related virus, called HTLV-II, has been isolated

rarely, originally from a patient with a hairy cell leukemia by Dr. Gallo and his group in collaboration with UCLA scientists. Dr. Gallo and his collaborators first reported biochemical evidence, and Dr. Max Essex and other scientists from the Harvard School of Public Health and the Centers for Disease Control reported immunological evidence, for an association between HTLV or a variant of it with AIDS in the May 12, 1983, issue of Science.

AIDS is an often fatal disease characterized by a severe loss of natural immunity that predisposes the patient to severe opportunistic infections and other disorders. These include Pneumocystic carinii pneumonia and Kaposi's sarcoma, a rare cancer that starts in cells of blood vessel walls. It occurs predominantly among homosexual men with multiple sexual partners, intravenous drug abusers, hemophiliacs, blood transfusion recipients, and close heterosexual contacts of members of these high-risk groups. The severe immune deficiency in patients with AIDS is caused by destruction of immune system cells in the blood called helper T-cells.

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