

Leukemia Virus Variant Fingered as Likely AIDS Cause

A variant of a virus known to trigger a rare form of human leukemia seems to be the long-sought cause of acquired immunodeficiency syndrome (AIDS), federal health officials announced this week. The case implicating the infectious virus, christened HTLV-3 for human lymphotropic retrovirus-3, is not completely closed. But researchers from the National Cancer Institute (NCI) and officials from the Department of Health and Human Services (HHS) felt confident enough in their findings to predict at an April 23 press conference that a commercial blood screening test for AIDS based on the virus could be available in six months, and a vaccine ready for human testing in two years.

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"I think the agent is at hand that produces the disease," said Robert C. Gallo, the NCI scientist whose research team characterized the virus in four papers to be published in the May 4 *SCIENCE*. In one of the reports they describe a method of mass-producing the organism in tissue culture—a critical hurdle in the development of tools to prevent and fight the disease. Edward N. Brandt Jr., Assistant Secretary of Health, agreed that the current findings "are not particularly of benefit to people who have the disease right now," nor do they mean that everyone with virus in their blood will develop full-blown AIDS. But the new ability to test for the virus in blood—a technique HHS is attempting to patent—should virtually eliminate the risk of acquiring AIDS through transfusion, he said, and open the possibility of early disease detection before symptoms take their toll.

Gallo says HTLV-3 is probably the same as an organism first identified last year by Luc Montagnier and fellow scientists at the Pasteur Institute in Paris (SN: 5/21/83, p. 324), though another month of genetic analysis and immunological comparisons will be necessary to pin down any differences between the organisms. Both men deny any rivalry between their groups in their race to identify the cause of the devastating immune disease that, since 1981, has afflicted more than 4,000 U.S. residents, killing more than 1,700. "If [the viruses] turn out to be the same, I will certainly say so, and I will say so with them in a collaboration," Gallo says. "We think the

two laboratories are very likely to come together, although I cannot say at this point whether the viruses are identical."

Both groups agree that the organisms they have isolated belong to a class of bugs called retroviruses which, with the help of an enzyme called reverse transcriptase, use RNA rather than the usual DNA as their basic genetic machinery. Tracking the enzyme as a footprint of the virus, Gallo and others first linked a retrovirus they named HTLV-1 to a rare, aggressive form of human leukemia found chiefly in Japan, the Caribbean and parts of Africa.

Spurred on by work with cats, which showed that one strain of a similar retrovirus prompts feline leukemia while another variant is linked to a disease similar to AIDS, Gallo and others persisted in searching for an HTLV variant in AIDS patients. The common focus was the "helper T-cell" or T lymphocyte, a type of white blood cell that serves in healthy persons (and cats) as a ringleader in activating immunity, and is severely depleted in AIDS patients.

Gallo isolated a second class of HTLV variants from the blood of AIDS patients, but in subsequent tests none of the variants were found in sufficient numbers of patients early enough in the course of their disease to be primary disease initiators—until HTLV-3. (Several other agents

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once suspected of causing AIDS, including cytomegalovirus and hepatitis B virus, are now assumed to be among the host of "opportunistic infections" that overwhelm an AIDS patient after his immune defenses have been stripped away.) When Montagnier and colleagues first described their virus last May, they weren't sure if their virus was a member of the HTLV family. They named their organism lymphadenopathy-associated virus (LAV) because of its initial discovery in a patient with the swollen lymph glands and flu-like symptoms thought sometimes to precede full-blown AIDS.

The main constraint in positively singling out the culprit virus from among a host of suspects has been the inability of researchers to grow the suspect virus in culture once they find it, Gallo says. "We've had a large number of detections of this virus, but I haven't been able to speak about it because we couldn't get enough to analyze it in detail," he says. Once they

could produce large quantities of the virus in laboratory culture, the NCI scientists were able to develop reagents and genetic probes that identified HTLV-3 in blood from 48 persons. They found antibodies to the virus in blood samples from approximately 88 percent of the 49 patients they describe in *SCIENCE* who were previously diagnosed as having AIDS, and in 79 percent of the 14 homosexual men studied who showed signs of lymphadenopathy.

Gallo declined to give details of corroborating evidence from another, yet-to-be-published report, done in collaboration with the federal Centers for Disease Control in Atlanta, though he hinted that "the work is producing fruitful results." The study involves checking for signs of the virus in samples from blood donors

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who later contracted AIDS, as well as in blood samples taken from the transfusion recipients. "The specifics will be published later," Gallo says. James O. Mason, head of the CDC, has praised both the French and U.S. work. "I think you've heard a most magnificent report today," he said. The findings will permit researchers to follow AIDS from infection to symptoms, to study the lengthy incubation and any synchronistic factors that make some persons particularly vulnerable, he added. "It begins a whole series of miracles that can occur as a result of these very basic reports."

HHS Secretary Margaret Heckler capitalized on the NCI finding to counter criticism voiced in the past by gay activist groups and others that federal funding for AIDS research has been inadequate. "Today's discovery represents the triumph of science over a dreaded disease," Heckler said at the press conference. "Those who have disparaged this scientific search—those who have said we weren't doing enough—have not understood how sound, solid, significant medical research proceeds," Heckler said.

Since 1981, the federal government has spent \$75 million in research on AIDS and another \$54 million is earmarked for AIDS research in the President's budget for fiscal 1985, Heckler added.

—D. Franklin