

Spread of AIDS Sparks New Health Concern

The finding of the new immune disease in hemophiliacs and children suggests that it may be spread by blood products and intimate family contact

The relentless new disease called acquired immunodeficiency syndrome (AIDS) continues to spread. According to officials at the Centers for Disease Control (CDC), some 22 children, identified at medical centers in Newark, New York City, and San Francisco, are suspected of having the disorder. Most of the children were in close contact with parents or other adults who either have AIDS or are at high risk of contracting the disease.

Moreover, blood products have come under increased suspicion as vehicles for spreading AIDS. An infant who received several infusions of whole blood and blood products developed the condition. One of the donors, who had appeared ill at the time he gave blood, eventually died of the disease. The CDC also reports the diagnosis of AIDS in four hemophiliacs, in addition to the three previously identified, confirming earlier suggestions that these individuals might be at high risk. "The problem in hemophiliacs is real," says the CDC's Harold Jaffe. "It isn't going to go away."

The latest reports support the hypothesis that AIDS is caused by an infectious agent, possibly a virus, that can be transmitted by close contact, including that between family members, or by blood products. The latter possibility raises a serious health issue about the safety of the blood products used by hemophiliacs and perhaps by the general public.

AIDS, which is thought to be a new disease, has a very poor prognosis. In the year and one-half since it was identified, 827 cases of AIDS have been reported to CDC, and 312 of the patients have died. Two or three new cases are reported to the CDC every day. Physicians treating the patients estimate that 65 percent will die within 2 years after the diagnosis, either of cancer, most often a hitherto rare type called Kaposi's sarcoma, or of any of several kinds of opportunistic infections, so-called because they strike individuals whose immune systems are defective. The underlying immune defect of AIDS affects the T lymphocytes, causing a profound suppression of the cellular arm of the immune system (*Science*, 13 August, p. 618).

The disease was first diagnosed in adults, principally in male homosexuals who had been extremely active sexually, users of intravenous drugs, and Haitians. The disease is apparently spread by sexual contact among homosexuals and by contaminated needles in the drug users. The reason for its prevalence in Haitians is unclear.

The mothers of several of the children who are now suspected of having AIDS are intravenous drug users; other mothers are Haitian. CDC officials hesitate to conclude unequivocally that the children have AIDS. Jaffe says, "We are having trouble sorting it out in children. We

don't have a single test for AIDS, and the children might have other types of immunodeficiencies. But their immune picture does not fit any of the well-described congenital immunodeficiencies."

The clinical picture presented by the children more closely resembles that of the adult AIDS patients. "If they were adults, it would be called AIDS," says James Oleske of St. Michael's Medical Center in Newark, where eight of the children have been identified. "These kids have immunological defects and infections that are characteristic of AIDS."

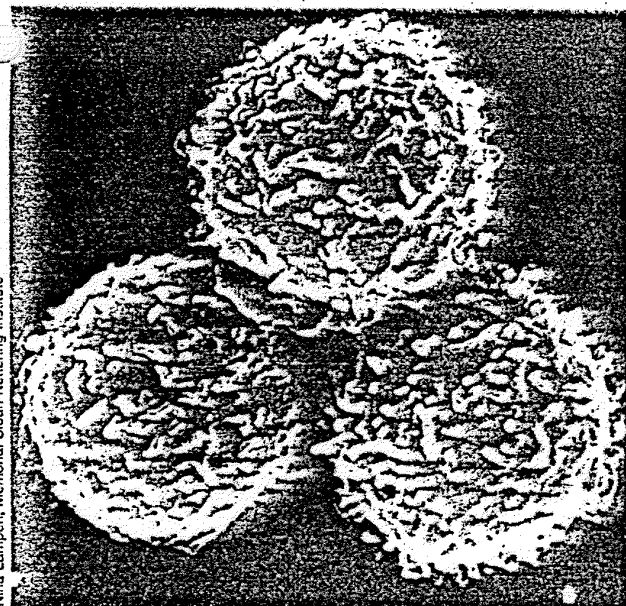
The most common life-threatening infection in the children, as in the adults, is a pneumonia caused by *Pneumocystis carinii*. Other infections, common in both the children and the adults, have been caused by viruses, including cytomegalovirus and herpes simplex virus, by yeast (*Candida*), and by *Mycobacterium avium-intracellulare*. So far none of the children have had cancer.

The principal immune defects of the children are also similar to those of adult patients. These include a marked decrease in the total number of T lymphocytes and a decrease in the ratio of helper T cells to suppressor T cells.

Arye Rubenstein of the Albert Einstein College of Medicine notes that the immune defects of the children are very different from those seen in congenital immunodeficiencies, in which the normal development of T or other immune cells is blocked with the result that the mature active cells are not formed. "The [AIDS] kids have mature T cells," Rubenstein explains, "but the proportion of helper and suppressor subsets is abnormal."

Ten of the most severely affected children have died, four of them infants who first became ill between 2 and 5 months of age. These children may have acquired AIDS while still in the womb, CDC officials suggest, or else very shortly after birth.

Two of the female children who died had the same mother, a prostitute and drug user who has AIDS symptoms herself. The woman's third daughter has some symptoms characteristic of AIDS, but has not suffered from life-threatening infections and is included in the less severely affected group of possible AIDS



Normal blood lymphocytes

The T lymphocytes of AIDS patients are depressed both in number and function.

Nina Lampen, Memorial Sloan-Kettering Institute

Children. Clinicians are watching these children to see if their conditions worsen and become full-blown AIDS.

The presence of AIDS symptoms in three daughters of the same mother might suggest an inherited immune defect. However, they had different fathers and it is unlikely that all would inherit the disease unless the defective gene were dominant, which is not the case for the known congenital immunodeficiencies. Alternatively and more probably, the three children might have been exposed to an infectious agent for AIDS, although it is still possible that they might have inherited an increased susceptibility to that agent. Evidence for genetic susceptibility has been found in adult AIDS patients.

AIDS resembles hepatitis B in the groups affected, especially the male homosexuals and intravenous drugs users, and in the apparent mode of transmission through intimate contact and through blood products.

The evidence for transmission to hemophiliacs is now clear-cut, CDC officials say. Altogether there are seven confirmed cases in heterosexual male hemophiliacs, two of whom were less than 10 years old, plus one in a homosexual male.

No common lot of clotting factor, which might have been the source of an infectious agent, has been identified as being used by the patients. The seven patients received clotting factor preparation containing material from the blood of many individuals, which makes tracking down any AIDS patient among the donors very difficult.

The one AIDS case in which an AIDS victim has been identified among blood donors was that of an infant boy who was in the group of children studied by Arthur Ammann and his colleagues at the University of California Medical Center in San Francisco. The infant did not have any close contacts with AIDS victims. In the month after his birth, he had received numerous transfusions of whole blood and subfractions of blood, including packed cells and platelets, to treat Rh disease, which is caused by an incompatibility between the baby's blood type and his mother's. A total of 19 donors contributed the blood products. One of them, CDC investigators learned, was a man who developed AIDS some 8 months after he had donated blood. If the infant did contract AIDS because he was infected by an agent in the man's blood, the case has serious

implications for the use of blood products. The agent must have been present and infectious for several months before it caused obvious symptoms.

The CDC is currently investigating the cases of two adult AIDS patients who do not have any of the common risk factors, but who did receive blood transfusions, to see if any of the donors might have developed AIDS.

Because of the serious nature of AIDS, its immediate threat to hemophiliacs who must have clotting factor, and its potential threat to a much wider population if it proves to be generally transmissible in blood products, Edward Brandt, assistant secretary for health in the U.S. Department of Health and Human Services, has called for an advisory committee to consider the current situation and determine what preventive steps ought to be taken regarding the collection of blood and its use. The committee meets on Tuesday, 4 January (2 weeks after this issue of *Science* went to press). The possibility that there may be a long latent period between the time of infection, by an as yet unidentified agent, and the emergence of AIDS symptoms will not make their task any easier.

—JEAN L. MARX

Fossil Lucy Grows Younger, Again

A combination of a chemical "fingerprint" and a comparison between dated fossils shows the Hadar hominids to be younger than previously thought

Dates are important to the story of paleoanthropology, but, as history repeatedly shows; they have a habit of shifting around before finally settling at a consensus. Two papers in a recent issue of *Nature** address the age of the rich array of hominid fossils, including the famous "Lucy," from the Hadar region of Ethiopia. According to the papers, one of which rests on geological methods while the other uses correlations with dated fossils from elsewhere, the Hadar hominids are around 0.5 million years younger than previously supposed.

Lucy may be just 2.9 million years old, and the "first family," a large collection of fragments from many individuals at one site, may be a little less than 3.2 million years old.

Does this redating affect the tale told by the bones? Inevitably, the answer depends on who is asked.

No, says Donald Johanson of the Institute of Human Origins, Berkeley. "The

important thing is the comparison of their morphology with that of fossils elsewhere. Redating does not affect our inference made from that comparison." In January 1979, Johanson, then at the Cleveland Museum, published a landmark paper with Tim White, at the University of California, Berkeley, describing the Hadar fossils as a new species of hominid, *Australopithecus afarensis*, which they suggested was ancestral to all later hominids.

Noel Boaz, an anthropologist at New York University, is coauthor with Monte McCrossin, also at NYU, and Clark Howell, at Berkeley, of the *Nature* paper on faunal correlations. Boaz contends that the new date for the Hadar material should make one rethink their interpretation. "This new date puts the Hadar fossils very close in age to some of the

South African *Australopithecus africanus* specimens, to which *afarensis* is supposed to have given rise," he says. This would clearly present a difficulty, if correct.

"In any case, there is a strong argument for saying that the Hadar fossils are not a new species at all, but are in fact *afarensis*," says Boaz. Part of Johanson and White's inference of a new species rests on the primitive nature of the teeth, particularly the canines and premolars. Boaz suggests these primitive features are also apparent in the South African material but that the relatively small size of the sample makes it less obvious.

One of the outstanding points of contention about the Hadar hominids is whether indeed they represent just one species, as Johanson and White argue, or several species, as suggested by others, including Yves Coppens of the Musée de l'Homme in Paris. Redating does not affect this issue, but it does have some

*N. T. Boaz, F. C. Howell, M. L. McCrossin, *Nature* (London) 300, 633 (1982); F. H. Brown, *ibid.*, p. 631.