Plasma HIV reflects AIDS progression

Two scientific teams reported this week that plasma and certain white blood cells from people who test positive for the AIDS virus, or HIV, harbor much more of the virus than previously suspected. The new findings, described in separate reports, suggest a tool for shortening the evaluation process in testing new AIDS drugs.

Earlier research showed that white cells called CD4-positive T4 lymphocytes carry more HIV than previously estimated (SN: 7/22/89, p.54), but scientists remained puzzled by the small amounts of HIV found in the monocytes and blood plasma of infected individuals. The new research establishes that lymphocytes, monocytes and plasma (the clear fluid remaining after all cells are removed) from HIV-positives harbor enough virus to dispel lingering doubts about HIV's central role in causing AIDS, says Mark B. Feinberg of the Whitehead Institute for Biomedical Research in Cambridge, Mass. He and Whitehead Director David Baltimore wrote an editorial accompanying the reports in the Dec. 14 NEW ENGLAND JOURNAL OF MEDICINE.

In one report, David D. Ho of the University of California, Los Angeles, and his colleagues describe their analysis of plasma, lymphocytes and monocytes taken from 54 people who tested positive for HIV antibodies. The study group included asymptomatic individuals as well as people with AIDS or ARC, an early stage of the disease. Using a newly refined, ultrasensitive culturing method, the researchers identified HIV in all 54 plasma samples and in all lymphocyte and monocyte samples. A control group of 22 healthy individuals with negative antibody tests showed no evidence of HIV in plasma or white blood cells, the team found.

"The amount of infectious HIV detected was higher by orders of magnitude than previously estimated," Ho says. Earlier, researchers had detected the virus in 1 of every 100,000 lymphocytes and monocytes taken from patients with AIDS. Ho's team found HIV in 1 of every 50,000 such cells taken from the 16 asymptomatic subjects in his group. Once disease symptoms appeared, the viral titer increased significantly: In the 38 subjects with AIDS or ARC, the researchers found HIV in 1 out of every 400 such cells isolated from blood samples.

In a second report, Robert W. Coombs of the University of Washington in Seattle and his colleagues describe their study of 213 people with positive antibody tests and varying stages of infection, finding 97 percent carried some level of HIV in their lymphocytes and monocytes. In plasma, the team detected HIV in 23 percent of the asymptomatic subjects, in 55 percent of those with AIDS or ARC and in more than 96 percent of a subgroup with AIDS whose blood was sampled repeatedly for viral presence.

Coombs' report suggests that some HIV-infected people, especially those without symptoms, show no evidence of HIV in their plasma. That finding contrasts with Ho's study, which found HIV in the plasma of all people with a positive antibody test. Feinberg says further research must determine whether Ho's method of detecting HIV in plasma yields some false positive results or detects traces of HIV missed by the Washington team.

Both groups found the HIV plasma levels correlated with disease progress. Many people who had little or no evidence of plasma HIV showed no symptoms, while higher levels appeared to reflect immune system destruction, Coombs says.

While offering physicians a potential gauge of patient status, the correlation also suggests researchers can use plasma HIV testing as an early laboratory marker of disease progression in testing the efficacy of AIDS drugs (SN: 11/4/89, p.298). Ho's team looked into that prospect by studying seven patients with AIDS or ARC who received a four-week course of zidovudine (AZT) treatment. By the end of the treatment period, the group's mean plasma HIV level had decreased by 94 percent. —*K.A. Fackelmann*

Texans devise battle plan for bee invasion

Bracing for what they call a "frontal invasion" of Africanized honeybees expected to hit their state this spring, Texas beekeepers and research entomologists express increasing frustration over the lack of a federal policy addressing the potentially devastating influx.

Since the bees' accidental release in Brazil in 1957, all attempts to stem their northward migration have failed, allowing swarms to approach within 150 miles of the Texas border. USDA inaction now leaves Texans holding the entire ball of wax, says Fowden G. Maxwell, an entomologist at Texas A&M University at College Station. Maxwell detailed a new statewide action plan he helped develop — which includes strict quarantines around affected hives — at this week's annual meeting of the Entomological Society of America in San Antonio, Tex.

"Because of a lack of federal policy, we could find ourselves in a serious situation in just a few months. We're going to be overrun by Africanized honeybees before APHIS even comes up with a plan," Maxwell says, referring to the USDA's Animal and Plant Health Inspection Service, the federal agency normally responsible for developing such strategies. Maxwell began agitating for a coordinated national strategy 2½ years ago.

"There is no [federal] plan right now," acknowledges Charles H. Bare of APHIS in Hyattsville, Md. An official statement expressing USDA's concern about the bees now awaits the Secretary of Agriculture's signature. However, Maxwell says, such a "Mom and apple pie statement" in itself does nothing other than encourage various USDA agencies, such as APHIS and the Agricultural Research Service, to begin formulating specific plans. "We can't wait that long," he argues, citing estimates that the invasion could cost Texas more than $130 million per year, mostly from decreased production of crops that depend upon traveling beekeepers whose transportable hives pollinate crops in the Rio Grande valley. Nationally, experts expect billions of dollars in damage from the aggressive insects, deemed loathsome because they sting too readily, produce too little honey and prove difficult to manage for agricultural pollination.

The Texas plan, likely to serve as a model for other states, recommends:

- Use of traps baited with bee-attracting pheromones to capture early-arriving "pioneer swarms," expected to hit Brownsville around March. Once established, Africanized hives can spawn new swarms within 36 days, whereas the European honeybees kept in the United States swarm yearly.
- A quarantine banning the transport of commercial hives within two miles of any discovered Africanized hive, as well as limited quarantines within a 150-mile radius to allow state officials to inspect for escaped Africanized queens, which can invade the nests of European honeybees and secretly begin mass-producing Africanized offspring. The quarantines could strand large numbers of mobile hives, preventing beekeepers from delivering them to crops desperately in need of immediate pollination.
- Mandatory annual requeening of commercial hives with certified European queens to eliminate hidden infestations with Africanized queens.
- Mass rearing and release of male European bees to dilute the genetic impact of Africanized males.

Conflicting data leave scientists hotly debating the value of releasing European males. Two studies published earlier this year suggest Africanized queens don't hybridize with their European cousins. But new evidence presented at this week's meeting contradicts those findings. Even hybrid Africanized bees may remain behaviorally incorrigible, however, and entomologists now discuss with resignation the prospect of learning to live with the intruders. —*R. Weiss*