



HIV/AIDS

# Early Treatment May Have Cured Infant of HIV Infection

ATLANTA—A baby in rural Mississippi appears to have been cured of an HIV infection, likely because doctors started treatment 30 hours after birth. This is “the first well-documented case” of its kind, said pediatrician Deborah Persaud at the 20th Conference on Retroviruses and Opportunistic Infections here this week. Persaud, who works at the Johns Hopkins Children’s Center in Baltimore, Maryland, did not treat the child herself but did extensive analyses of blood samples. She and her colleagues concluded that unusually early administration of anti-HIV drugs may have enabled the now 2-and-a-half-year-old to clear an established infection.

As Persaud explained, the child was born in July 2010 after 35 weeks of gestation. Doctors did not learn about the mother’s HIV infection until she was in labor, and she did not receive antiretroviral drugs. (The baby’s gender and caretakers aren’t being identified for privacy reasons.) Because of the premature birth, doctors decided to move the baby to the University of Mississippi Medical Center (UMMC) in Jackson, which performed two separate blood tests on the 2-day-old infant and found HIV RNA and DNA. UMMC pediatrician Hannah Gay decided to begin a cocktail of AZT and two

other anti-HIV drugs 31 hours after birth. Typically, Persaud noted, up to 6 weeks can pass before tests confirm an HIV infection in newborns.

Laboratory tests at 6, 12, and 20 days repeatedly found HIV in the baby. But by 29 days, the virus was undetectable on standard tests. For unknown reasons, the baby’s caretakers decided to stop treatment at 18 months. In the fall of 2012, when the 21-month-old came in for a checkup, Gay couldn’t find HIV antibodies or the virus. “It was quite unbelievable,” Persaud said. Gay then contacted immunologist Katherine Luzuriaga at the University of Massachusetts Medical School in Worcester for help, who in turn asked Persaud’s group at Hopkins to scour the blood samples for evidence of HIV persistence.

Persaud’s team, which has ongoing studies of babies who start treatment early, uses an array of ultrasensitive screens for HIV. The researchers first tested the toddler’s blood 24 months after birth and found only a single copy of HIV RNA in the plasma. To assess whether the child still harbored intact virus, or whether the RNA represented defective versions of the virus that can’t copy themselves, they mixed the child’s blood with uninfected CD4 cells—HIV’s main target—

**Surprising success.** Deborah Persaud found only traces of apparently defective HIV in a toddler infected at birth.

to see if the cells produced new virus. They did not. Further tests at 26 months again found tiny genetic traces of the virus, but it did not appear to have integrated into cells, which it must do to copy itself. “We’re very excited and planning new studies to assess this,” says Lynne Mofenson, who heads the maternal and pediatric infectious disease branch of the U.S. National Institute of Child Health and Human Development in Bethesda, Maryland, and was not involved in this analysis.

Persaud suspects that the early treatment prevented the establishment of a reservoir of long-lived CD4 cells that harbor latent HIV infections; these infected cells avoid immune detection and are impervious to antiretroviral drugs. Such reservoirs are a central reason why the virus persists even after decades of antiretroviral treatment.

In the history of the AIDS epidemic, researchers have convincingly shown that only one HIV-infected person, Timothy Brown (*Science*, 13 May 2011, p. 784), has been cured. Brown had leukemia and received bone marrow transplants from a donor whose CD4 cells had a mutation that made them resistant to HIV infection. “We believe this is our Timothy Brown case to spur research interest and get us on the road toward a cure for HIV-infected children,” Persaud said.

Persaud acknowledges that, like Brown, this is a single case, and the child may still harbor an undetected infection. Even so, “this has very important implications for pediatric HIV infection and the ability to achieve cure.”

Effective antiretroviral treatment of pregnant women has made transmission of HIV to infants rare everywhere it’s used. But Mofenson, who gave a presentation here on mother-to-child transmission, noted that some 330,000 new pediatric infections occurred worldwide in 2011. Even in the United States, where fewer than 200 HIV-infected babies are born each year, mother-to-child transmission occurs when treatment guidelines aren’t followed, as happened in this case.

Mofenson cautions that it will be far easier to promptly diagnose HIV infection and treat babies early in wealthy places like the United States. “It will be very difficult to actually implement it in developing countries,” she says. “The key to elimination of pediatric HIV is to prevent infection in the first place.”

—JON COHEN