

Is Live, Infectious HIV in Milk of HIV Positive Mothers?

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There is a widespread belief that HIV in milk from HIV-positive mothers transmits live HIV to breastfed infants. But has this contention been proven?

Three articles have been cited as proof of live HIV in human milk. They are as follows:

1. Thiry L, Sprecher-Goldberger S, Jonckheer T, Levy J, Van de Perre P, Henrivaux P, Cogniaux-LeClerc J, Clumeck N. Isolation of AIDS virus from cell-free breast milk of three healthy virus carriers [letter]. *Lancet*. 1985;2:891-892
2. Vogt MW, Witt DJ, Craven DE, Byington R, Crawford DF, Schooley RT, Hirsch MS. Isolation of HTLV-III/LAV from cervical secretions of women at risk for AIDS. *Lancet*. 1986;1:525-527
3. Southern SO. Milk-borne transmission of HIV. Characterization of productively infected cells in breast milk and interactions between milk and saliva. *Journal of Human Virology*. 1998;1:328-337

Dr. Miles Cloyd, PhD, Departments of Microbiology & Immunology and Pathology at the University of Texas Medical Branch, reviewed these articles and made the following comments:

The Thiry et al paper in *Lancet*, 1985. The authors stated that they isolated HIV from human milk in H9 cells. However, H9 cells are not ideal for that purpose for the following reasons. They detected HIV very quickly in the H9 cells. That raised a suspicion that these cells were already infected with HIV_{IIIB} (the original virus that the French group isolated and was adapted to grow in H9 cells by the Gallo group). Gallo sent H9 cells, both uninfected and infected with this virus, to many investigators. The authors also stated that they isolated HIV in mononuclear leukocytes from the milk of one of three HIV+ mothers. That might be true, since they did not use H9 cells. However, since the experimental details are lacking, it is difficult to assess how the studies were performed. Thus, the results in this publication are very questionable.

The Vogt et al paper in *Lancet*, 1986. The authors stated that they isolated HIV in mononuclear leukocytes from the blood and vaginal sections of HIV-positive patients. This is known to be relatively easy to do, especially from the blood. They also stated that HIV was isolated from the cellular fraction of colostrum from one patient. This might be true, since the human colostrum contains many macrophages and some T cells, which can be infected with HIV. Nevertheless, since the data were not shown, it is impossible to know whether their claim was valid.

The Southern paper in the *Journal of Human Virology*, 1998. In this thorough study, HIV productively infected cells were identified in milk from HIV-positive mothers. HIV-producing cells were present in breast milk at ratios of approximately 0.1% to 1% of the mononuclear cells. This paper also showed that saliva had inhibitory effects on the milk

cells. The authors concluded that transmission from milk by the oral route is much less frequent than transmission through the sexual route. Thus, this paper shows that HIV-producing cells are present in low numbers in milk. However, there were no data regarding the frequency of the transmission of HIV to infants by breastfeeding.

The only data that would be relatively convincing that breastfeeding can lead to HIV infections in infants requires well controlled epidemiology studies. However, most of the early studies were flawed. This is because investigators were unable to determine whether babies are infected at the time of birth or before then. In that respect, infants may become HIV-positive by one year of age because of one or more of the following possibilities: (1) in-utero HIV infection (2) HIV infections during the birthing process, and (3) HIV infections by breastfeeding.

The only reliable studies on the transmission of HIV infections by breastfeeding alone are more recent epidemiological studies, which compared breastfeeding versus bottle-feeding of infants born to HIV-positive mothers. Those studies do not show a higher frequency of HIV infection with breastfeeding versus bottle-feeding. Therefore, there is no convincing evidence that infants become infected with HIV by breastfeeding, per se.

Do you believe the presence of an adequate number live infectious HIV in human milk to produce an infection in the recipient infant? If so, where is the proof?

Do you think such important evidence is needed to development policies and practices leading to the best possible outcomes for mothers and babies in relation to breastfeeding and HIV/AIDS? If not, why?