

Breast milk cellular HIV-specific interferon ? responses are associated with protection from peripartum HIV transmission.

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Abstract

OBJECTIVE: Breast milk is a major route of infant HIV infection, yet the majority of breast-fed, HIV-exposed infants escape infection by unknown mechanisms. This study aimed to investigate the role of HIV-specific breast milk cells in preventing infant HIV infection.

DESIGN: A prospective study was designed to measure associations between maternal breast milk HIV-specific interferon- γ (IFN- γ) responses and infant HIV-1 detection at 1 month of age.

METHODS: In a Kenyan cohort of HIV-infected mothers, blood and breast milk HIV-gag IFN- γ ELISpot responses were measured. Logistic regression was used to measure associations between breast milk IFN- γ responses and infant HIV infection at 1 month of age.

RESULTS: IFN- γ responses were detected in breast milk from 117 of 170 (69%) women. IFN- γ responses were associated with breast milk viral load, levels of macrophage inflammatory protein (MIP) 1 α , MIP-1 β , regulated upon activation, normal T-cell expressed, and secreted and stromal-cell derived factor 1 and subclinical mastitis. Univariate factors associated with infant HIV infection at 1 month postpartum included both detection and breadth of breast milk IFN- γ response ($P = 0.08$, $P = 0.04$, respectively), breast milk MIP-1 β detection ($P = 0.05$), and plasma ($P = 0.004$) and breast milk ($P = 0.004$) viral load. In multivariate analyses adjusting for breast milk viral load and MIP-1 β , breast milk IFN- γ responses were associated with an approximately 70% reduction in infant HIV infection [adjusted odds ratio (aOR) 0.29, 95% confidence interval (CI) 0.092-0.91], and each additional peptide pool targeted was associated with an approximately 35% reduction in infant HIV (aOR 0.65, 95% CI 0.44-0.97).

CONCLUSION:

These data show breast milk HIV-gag-specific IFN- γ cellular immune responses are prevalent and may contribute to protection from early HIV transmission. More broadly, these data suggest breast milk cellular responses are potentially influential in decreasing mother-to-child transmission of viruses.