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Pediatr Infect Dis J. 2010 Oct;29(10):919-23. doi: 10.1097/INF.0b013e3181e232ea.



## Inhibitory effect of breast milk on infectivity of live oral rotavirus vaccines.

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### Abstract

**BACKGROUND:** Live oral rotavirus vaccines have been less immunogenic and efficacious among children in poor developing countries compared with middle income and industrialized countries for reasons that are not yet completely understood. We assessed whether the neutralizing activity of breast milk could lower the titer of vaccine virus and explain this difference in vitro.

**METHODS:** Breast milk samples were collected from mothers who were breast-feeding infants 4 to 29 weeks of age (ie, vaccine eligible age) in India (N = 40), Vietnam (N = 77), South Korea (N = 34), and the United States (N = 51). We examined breast milk for rotavirus-specific IgA and neutralizing activity against 3 rotavirus vaccine strains-RV1, RV5 G1, and 116E using enzyme immunoassays. The inhibitory effect of breast milk on RV1 was further examined by a plaque reduction assay.

**FINDINGS:** Breast milk from Indian women had the highest IgA and neutralizing titers against all 3 vaccine strains, while lower but comparable median IgA and neutralizing titers were detected in breast milk from Korean and Vietnamese women, and the lowest titers were seen in American women. Neutralizing activity was greatest against the 2 vaccine strains of human origin, RV1 and 116E. This neutralizing activity in one half of the breast milk specimens from Indian women could reduce the effective titer of RV1 by ~2 logs, of 116E by 1.5 logs, and RV5 G1 strain by ~1 log more than that of breast milk from American women.

**INTERPRETATION:** The lower immunogenicity and efficacy of rotavirus vaccines in poor developing countries could be explained, in part, by higher titers of IgA and neutralizing activity in breast milk consumed by their infants at the time of immunization that could effectively reduce the potency of the vaccine. Strategies to overcome this negative effect, such as delaying breast-feeding at the time of immunization, should be evaluated.

PMID: 20442687 PMCID: [PMC3704726](#) DOI: [10.1097/INF.0b013e3181e232ea](#)[Indexed for MEDLINE] [Free PMC Article](#)

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