

Infant Salivary and Maternal Breast Milk sIgA Across the First 6 Months Post-Partum

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Introduction

- Infant salivary secretory immunoglobulin A (sIgA) levels change dramatically over early infancy (Gleeson & Cripps, 2004).
- The primary immunoglobulin found in human breast milk is sIgA (Bradtzaeg, 2009), which is produced to specifically target pathogens in the dyad's immediate environment.
- It is thought that the antimicrobial components of breast milk may modulate the infant's developing immune system with potentially long-term effects (Hanson, 1998).
- Past studies have linked maternal report of breastfeeding status and infant salivary immunity (Gleeson et al., 1986), or examined antigen specific antibodies in breast milk in relation to infant illness (Cruz et al., 1988).
- **However, no study has longitudinally examined:**
 1. The within person stability and overall continuity of sIgA in breast milk and infant saliva.
 2. The inter-relations between breast milk and infant salivary sIgA.
 3. The effect of breastfeeding intensity and status on infant sIgA.

Methods

Participants: Participants were drawn from a prospective study of 51 mother-child dyads. Mothers were recruited during the third trimester of pregnancy; the majority was Caucasian, married, and nulliparous.

Procedure: Researchers went to participants' homes to administer questionnaires and collect breast milk samples from the mother and saliva samples from the infant at each home visit (HV).

	HV1	HV2	HV3
N	49	47	45
Infant Sex (% Female)	46.9	46.8	48.9
Infant Age (Weeks)	4.38	15.27	26.62
Breastfeeding (%)	85.7	72.3	64.4
Exclusive Breastfeeding (%)	63.3	44.7	35.6

Measures:

Breastfeeding: Breastfeeding Status Questionnaire (Labbok & Krasovek, 1990)

- Exclusively Breastfed: infants who derived nutrition solely from breast milk.
- Exclusively Formula Fed: infants who derived nutrition solely from formula.

Secretory Immunoglobulin A:

- Maternal breast milk was collected into plastic cryovials.
- Infant saliva was collected using a highly absorbent hydrocellulose swab.
- All samples were assayed for sIgA using an indirect enzyme immunoassay (Salimetrics, State College, PA).
- **Stability:** consistency in rank ordering within individuals across time.
- **Continuity:** consistency in absolute mean levels across time.

Results

1. Stability and continuity of sIgA within mothers and infants:

- Maternal breast milk sIgA (HV1-2: $r=.39^*$; HV2-3: $r=.40^*$) and infant salivary sIgA (HV1-2: $r=.38^*$; HV2-3: $r=.49^{**}$) showed stability across all three visits.
- sIgA levels significantly decreased from HV1 to HV2 for both breast milk ($b = -.60^{**}$) and infant salivary sIgA ($b = -.55^{**}$).

2. Inter-relations of sIgA between maternal breast milk and infant saliva:

- Breast milk sIgA was higher than infant salivary sIgA, at all three time points ($b = 1.03^{**}$; see figure 1).
- No effect of breast milk sIgA on infant sIgA was found at HV1 or 2, however, at HV 3, mothers with greater amounts of sIgA in their breast milk, had infants with lower levels of salivary sIgA ($b = -.51^*$).

3. The effect of breastfeeding on infant sIgA at six months:

- At six months (HV3), neither breastfeeding ($b = -.25$, ns) nor exclusive breastfeeding ($b = -.39$, ns) was related to infant sIgA. While not significant, Cohen's d suggests breastfeeding has moderate practical significance ($d = .31$) and exclusive breastfeeding has large practical significance ($d = .49$) for infant salivary sIgA.
- Exclusively breastfed infants had sIgA levels that were 27% lower than exclusively formula fed infants (see figure 2).

Figure 1 Breast milk sIgA was higher than infant salivary sIgA at all three time points. sIgA levels significantly decreased from HV1 to HV2 for both breast milk and infant salivary.

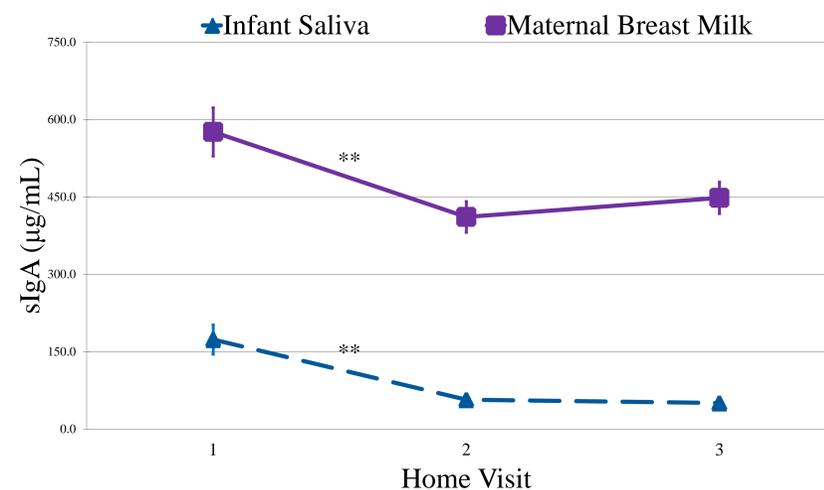
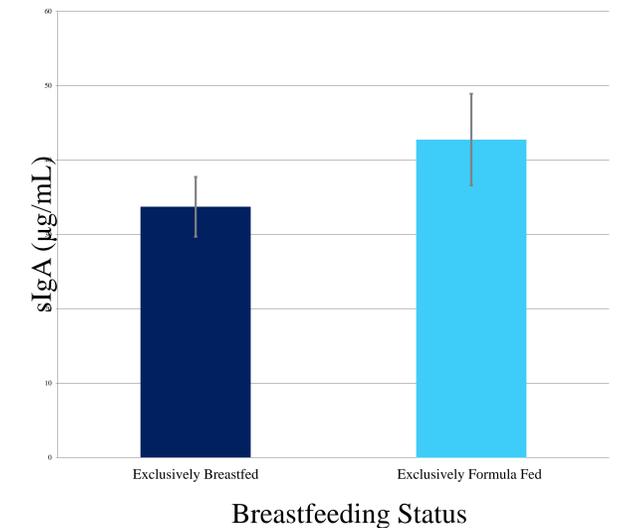


Figure 2 Exclusive feeding status and infant sIgA levels at 6 months.



Discussion

- Combinations of significance testing and Cohen's d suggest breast milk sIgA, breastfeeding, and exclusive breastfeeding reduce infant sIgA production.
- Breastfeeding may provide infants with highly efficient maternal antibodies, decreasing infants' sIgA production.
- Heightened salivary sIgA in the formula fed infants may also be a reaction to localized oral infection of opportunistic bacteria fostered by formula (Nowak & Warren, 2000).
- Future explorations should examine similar processes in additional immune factors such as other secretory antibodies or cytokines. Likewise, examining antibody responses to specific antigens will help elucidate the process by which maternal sIgA leads to a reduction in infant sIgA.

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