

BALANCING IMMUNE PROTECTION AND EMOTION REGULATION: EVIDENCE FOR EARLY-LIFE TRADE-OFF IN BREASTFED INFANTS

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Background: Infant temperament changes during the first year of life, reflecting developmental changes in brain structure and function. Brain development is shaped by the immune system, which in infants is influenced by bioactive components present in breast milk.

Objective: This study examined the association between immunoactive factors in breast milk and the development of infant temperament during the first year of life.

Subjects and methods: The study included a sample of 112 mothers and their exclusively breastfed infants from Wroclaw (Poland) participating in the Mums Milk Plus. Concentrations of S-IgA, IgM, IgG, and lactoferrin were analysed in milk samples collected at 5 m using an ELISA method. Temperament traits were assessed using the Infant Behaviour Questionnaire at 5 and 12 m of life. Statistical analysis was conducted using linear mixed models.

Results: The infant temperamental trait Orienting/Regulation was associated with IgG ($\beta=0.28$, $p=0.042$) and IgM ($\beta=0.18$, $p=0.002$) levels at 5 and 12 months. Maternal depression, infant sex, and infant age did not confound these associations.

Conclusion: These findings may indicate that maternal immunological investment through breast milk is linked to infant neurobehavioral development, pointing to a potential developmental trade-off between immune support and the maturation of regulatory functions.

Keywords: Breastmilk; Immunoglobulins; Temperament; Emotion regulation.

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