

Digging Deeper: Breast Milk

1. What is the main question the paper answers? Identify the question and any hypotheses the authors mention. Is this related to a set of observations, a long-standing question, or a theoretical prediction?

This study focused on how the illness of a breastfeeding baby might affect and be affected by the immune molecules a mother produces in her breast milk. The researchers hypothesized that the immune molecules were interacting with the timing of illness in babies in two possible ways—either high concentrations of immune molecules would prevent illness (the protective idea), or high concentrations of immune molecules would be produced in response to illness (the responsive idea). These theoretical predictions come from studies that show the immune molecules in mother’s milk are very important to a baby’s health.

2. Was the study well designed to address the hypothesis (or hypotheses)?

Milk samples were collected from mother-infant pairs (of the indigenous Qom/Toba people of Argentina) over time. These samples were then analyzed for the immune molecules lactoferrin and secretory immunoglobulin A (sIgA). This study was well designed for a first look at how levels of immune molecules affect or are affected by illness of a nursing child.

3. What are the data presented in the paper? If they presented actual data, what was their sample size (e.g., people, animals, or habitats, etc.)?

Symptoms of illness and concentrations of immune compounds in milk samples were presented. Samples were collected from 30 mother-infant pairs. Pairs were visited once a month, and mothers were asked health history over that past month. This sampling design did not always allow for collections during periods of illness. Some pairs were in the study for five months, but most were in for four or less.

4. What did the researchers conclude and do they provide enough evidence to support their conclusion?

They concluded that increases in sIgA were associated with lower rates of illness and that increases in lactoferrin were associated with higher rates of illness. This shows that these two immune molecules in milk can be used as biomarkers that predict illness in a breastfeeding Qom child. Their evidence supports this conclusion.

5. What possible explanations for the results are considered in the article? Do they cover all the possibilities? Is each explanation given fair consideration?

The protective/responsive framework was the main explanation considered in the article. They do mention other studies in which lactoferrin levels did not change, and where sIgA was correlated more with mother illness than infant illness. They also discussed the alternative idea that changes in immune molecules could be to protect the mother’s breast tissue from pathogens in the baby’s saliva rather than to protect the health of the baby. They also explore in decent depth the possibility that the different patterns seen between the two molecule types were due either to different costs and benefits to the mother and child of each type, or due to issues in the time scale resolution.

6. Did the researchers identify any issues with their data or methods? Were there any issues they didn't mention?

Researchers discuss the limited number of samples in the study. Larger sample sizes would have allowed for a stronger analysis, but a low sample size here means there were fewer sick infants, which should be viewed as a positive. Additionally, the researchers discussed potential issues from the time delays between infant illness and changes in breast milk composition, as well as issues with the timing of sampling. Presence of infant illness was self-reported by mothers, which may also present an issue, as data from memory can be inaccurate. Finally, with a limited number of participants and illness-linked samples, variation may be high and affect the findings. The authors mentioned all of these issues.

7. What could the researchers have investigated more thoroughly or explained better?

I believe researchers could have investigated the effects of infant illness on mother's milk composition more comprehensively by taking samples and interviews in response to infant illness, rather than at preset, periodic points in time. The strategy they took was likely due to difficulty in accessing the Qom people, however, so it may have been unavoidable.

8. Why is this study important? Was it interesting to you? (And if so, why?)

This study is important because it represents a preliminary look at how a mother's body responds to illness in her infant. The study was highly correlative, meaning it aligns sets of observations, rather than testing a cause-effect relationship. Despite this, the experiment presents a framework for future research to test, and ultimately to disprove, support, and/or add to. I found this article interesting because the framework it provides takes into consideration the different ways the mother and infant could be responding to one another. The combination of this theoretical framework with collected data presents a strong view of breastmilk in terms of the evolutionary benefits to a mother of being able to respond with immune assistance to an ill child while balancing the amount of energy spent.