

The protective effect of human milk against COVID-19

Dr Rebecca Powell
Icahn School of Medicine at Mount Sinai Hospital

Approximately 10% of infants will experience COVID-19 illness requiring advanced care (1). A potential mechanism to protect this population could be provided by passive immunity through the milk of a previously infected mother. We and others have reported on the presence of SARS-CoV-2-specific antibodies in human milk (2-5). We now report the prevalence of SARS-CoV-2 IgA in the milk of 75 COVID-19-recovered participants, and find that 88% of samples are positive for Spike-specific IgA. In a subset of these samples, 95% exhibited robust IgA activity as determined by endpoint binding titer, with 50% considered high-titer. These IgA positive specimens were also positive for Spike-specific antibodies bearing the secretory component. Levels of IgA antibodies and antibodies bearing secretory component were shown to be strongly positively correlated. The secretory IgA response was dominant among the milk samples tested compared to the IgG response, which was present in 75% of samples and found to be of high-titer in only 13% of cases. Our IgA durability analysis using 28 paired samples, obtained 4-6 weeks and 4-10 months after infection, found that all samples exhibited persistently significant Spike-specific IgA, with 43% of donors exhibiting increasing IgA titers over time. Finally, COVID-19 and pre-pandemic control milk samples were tested for the presence of neutralizing antibodies; 6 of 8 COVID-19 samples exhibited neutralization of Spike-pseudotyped VSV (IC₅₀ range, 2.39 – 89.4ug/mL) compared to 1 of 8 controls. IgA binding and neutralization capacities were found to be strongly positively correlated. These data are highly relevant to public health, not only in terms of the protective capacity of these antibodies for breastfed infants, but also for the potential use of such antibodies as a COVID-19 therapeutic, given that secretory IgA is highly stable not only in milk and the infant mouth and gut, but in all mucosa including the gastrointestinal tract, upper airway, and lungs (6).

References

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