



## **Editorial**

# **Breast Milk and Breastfeeding: Benefits, Barriers, Maternal Predictors, and Opportunities for Innovation**

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One of the defining characteristics of female mammals that is integral to the survival of the species is the ability to nurture their young with their milk. However, alternate human milk feeding, provided by a wet nurse in early reports, has been described as early as 1800 BC. In the early 20th century, cow's milk-based formulas were developed and, due to industry influence and convenience, were adopted as the normative feeding choice for infants in the mid-20th century.<sup>1</sup> Since then, the pendulum has swung, and mother's own milk feeding is endorsed universally as the optimal feeding choice given the durable health benefits for the dyad.

Breast milk feeding has been linked to improved infant health outcomes in observational studies, particularly in the vulnerable preterm population.<sup>2</sup> Breastfeeding also benefits maternal health outcomes in the short and long term, with longer duration of breastfeeding associated with lower rates of metabolic syndrome and malignancies.<sup>3</sup> Despite these benefits, >60% of US women do not achieve their breastfeeding goals,<sup>4</sup> with more research needed as to the social and biological underpinnings of lactation outcomes. Recent data have also emerged highlighting maternally driven variability in human milk composition that could affect child health outcomes. For example, numerous independent groups have reported that women with obesity have differences in breast milk composition that may be associated with differences in growth patterns in infancy.<sup>5-9</sup> Similarly, women with metabolic conditions such as diabetes and preeclampsia, as well as women who deliver preterm, have differences in breast milk composition from unaffected control women.<sup>10-13</sup> Thus, to devise effective interventions with the goal of optimizing the benefits of breastfeeding for mother and infant, we need to delineate the social

and biological barriers that prevent achievement of breastfeeding goals while also defining the molecular pathways that contribute to variability in milk composition.

In this special topic edition of *Clinical Therapeutics*, we examine the predictors of breastfeeding and breast milk composition and their role in outcomes. North *et al.* review the global role of breast milk feeding on infant health and highlight the broad impact of increasing breastfeeding rates and duration in low- and middle-income countries.<sup>14</sup> Standish and Parker examine the social determinants of breastfeeding in the United States and present a promising framework within which to affect change in breastfeeding behaviors.<sup>15</sup> Nagel *et al.* review the understudied role on maternal psychosocial stress on lactation outcomes.<sup>16</sup> Shah *et al.* present compelling evidence that maternal glycemia affects the microRNA composition of breast milk.<sup>17</sup> Zeinali *et al.* uniquely present human milk as a vehicle to influence infant health outcomes through modulation of the nascent and rapidly evolving infant microbiome.<sup>18</sup>

The overarching goal of this special topic edition is to underscore the critical role of breast milk and breastfeeding in maternal and infant health while magnifying ongoing research to better characterize breast milk composition and lactation outcomes. By addressing this public health issue through these complementary lenses, we strive to stimulate innovation and collaboration to

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re-envision the future of human milk feeding as a vehicle for optimally supporting health for all mothers and infants.

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