



## Preface

# Maternal, Fetal, and Neonatal Nutrition Has Lifelong Implications



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Nutrition during the late perinatal and neonatal period is an important “environmental” modifier of long-term metabolic, growth, and developmental outcomes.<sup>1-5</sup> Preclinical and human clinical studies show that fetal undernutrition can occur due to maternal undernutrition, altered placental growth, or impaired uteroplacental vascular perfusion.<sup>6,7</sup> In animal models, maternal undernutrition can cause perinatal/neonatal metabolic derangements; cause anatomical/functional changes in the liver, pancreas, and the intestine; predispose to neurobehavioral changes, possible loss of cognitive potential; and even introduce risk factors for long-term outcomes, such as obesity, insulin resistance, and diabetes.<sup>5,8,9</sup> After birth, feeding has been known to influence the functional programming of the gastrointestinal tract, including metabolic, endocrine, and neurologic responses.<sup>10-14</sup> Nutrition can also alter the neonatal microbiome: it can change the timing and proportion in which the microbial flora gets established in the developing gut.<sup>15,16</sup> It can induce and maintain epigenetic changes, which can manifest with subtle interindividual variations in expression of isoforms of digestive enzymes and enterocyte receptors.<sup>17-19</sup> In at-risk premature infants, nutrition has a direct impact on developmental or nutritional anemia and influences the inflammatory milieu.<sup>18,20-24</sup> In some infants, conditions such as necrotizing enterocolitis may cause loss of intestine, both anatomically and functionally, and can set up the infant for further dysfunctional feed-forward loops.<sup>25-27</sup> In the medium/longer term, the loss of intestine can restrict later growth and metabolic health.<sup>28,29</sup> In short, there is good justification for continued investigation of the importance of nutrition during the late-fetal and early-neonatal periods for immediate, medium-, and long-term clinical outcomes.

In this issue, we have focused on the importance of maternal nutrition, metabolic/epigenetic impact of maternal milk lipids, systemic effects of milk-borne lipids and

glucose, and the impact of diet on the immune system. Some articles describe the potential benefits and systemic effects of milk fortification and nutritional supplements. An important section discusses the impact and therapeutic strategies to manage altered function/anatomy in infants with swallowing dysfunction, intestinal dysmotility, malabsorption, and short bowel syndrome. We have also evaluated the best methods for nutritional assessment. Finally, there are sections that inform about the impact of inadequate feeding, and the long-term impact of early nutritional management.

Irrespective of your role in the NICU, be it as a consultant or a bedside clinician, this issue of *Clinics in Perinatology* will be of interest. From full-term infants to micropremies, optimal nutrition plays a significant role in the health and well-being of all our little patients.

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