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Media Summaries

The following articles are being published in the March 2018 issue of *The Journal of Nutrition*, a publication of the American Society for Nutrition. Summaries of the selected articles appear below; the full text of each article is available by clicking on the links listed. Manuscripts published in *The Journal of Nutrition* are embargoed until the article appears online either as in press (Articles in Press) or as a final version. The embargoes for the following articles have expired.

Researchers characterize "reference" microbiomes of very-low-birth-weight infants exclusively fed their own mothers' milk

Omega 3 supplementation during pregnancy or early life may be beneficial

Researchers characterize "reference" microbiomes of very-low-birth-weight infants exclusively fed their own mothers' milk

For almost all babies, exclusive breastfeeding is the nutritional gold standard during the first 4 to 6 months of life. This is particularly true for premature and very-low-birth-weight infants who, compared to full-term and healthy-weight infants, are at increased risk for illness. However, many of these at-risk infants are unable to feed at the breast and must be fed either via tube feeding their own mother's milk or that provided by donor mothers. Although scientists are still trying to understand why feeding human milk (rather than commercial formula) is so beneficial to these infants, they believe that its effects on the bacteria living in the infant's gastrointestinal (GI) tract is likely important. As such, there is growing interest in developing probiotic (live bacteria-containing) products that could be given to very-low-birth weight infants to help similarly colonize their GI tracts when human milk is not available. Under the leadership of Drs. Deborah O'Connor and Sharon Unger (Toronto) and Drs. Alain Stintzi and James Butcher (Ottawa), in the March 2018 issue of *The Journal of Nutrition*, Drs. O'Connor and Stintzi answer an even more basic question that they believed needed to be answered first. That is: what are the bacterial communities in stool samples of very-low-birthweight infants exclusively fed their own mothers' milk? Indeed, this question should be answered prior to manipulating fecal microbiota in this at-risk population of infants via probiotics.

Their research utilized a prospective, longitudinal, observational approach which means that samples were repeatedly collected from infants not exposed to any sort of scientific or dietary intervention. A total of 54 very-low-birth-weight infants being exclusively fed their own mothers' milk were followed from birth until they were about 80 days old or when formula or donor milk was introduced. Mothers pumped milk for their infants, and the milk was fortified with nutrients as per hospital protocols. Infant stool samples were collected weekly and analyzed using state-of-the-science methods. The research team then used these data to not only characterize fecal bacterial profiles but also to explore whether they were likely influenced by a variety of factors such as infant age, delivery mode (vaginal vs. surgical), and antibiotic use.

Results suggest that fecal microbiomes are, very soon after birth, personalized to the infant and not appreciably influenced by any of the factors studied except for antibiotic use and infant age. Relative distribution of the bacteria also evened out as the infants got older – a finding consistent with healthy maturation of the infant's GI tract. Interestingly, the study found very low levels of *Bifidobacterium*, a bacterial genus often purported to play a dominant role in colonizing the infant's GI tract and conferring health benefits. In conclusion, the scientists posit that the beneficial effects of breastfeeding and/or feeding human milk to very-low-birth-weight infants is likely not solely due to the presence of *Bifidobacterium*.

Reference Butcher J, Unger S, Li J, Bando N, Romain G, Francis J, Mottawea W, Mack D, Stintzi A, O'Connor DL. Independent of birth mode or gestational age, very-low-birth-weight infants fed their mothers' milk rapidly develop personalized microbiotas low in *Bifidobacterium*. *Journal of Nutrition* 2018 148:326-35.

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Omega 3 supplementation during pregnancy or early life may be beneficial

Maintaining brain health and function is a life-long priority. However, making sure that brain development is optimal may be most critical during fetal and early postnatal life. Made primarily of fat-derived substances, the brain has an especially high requirement for a group of oils referred to as "omega-3 fatty acids," particularly docosahexaenoic acid (DHA). Although infants can make some DHA, growing fetuses and newborns rely mainly on their mothers during pregnancy or breastmilk or DHA-fortified formulas after birth to obtain the DHA they need. Some research also suggests that, in addition to obtaining DHA from dietary sources, there might be benefits of supplementing mothers, infants, and/or toddlers with extra DHA via either fortified foods or supplements. Results, however, are not consistent in this regard, likely because of substantial differences in how the trials have been conducted. To help fill this knowledge gap, Dr. Dariush Mozaffarian (Friedman School of Nutrition and Science Policy at Tufts) and colleagues mathematically combined results from 38 previously conducted trials designed to explore the effects of maternal and/or infant omega-3 supplementation on neural development – particularly cognition, muscle (motor) development, and eyesight. Their findings, briefly outlined here, are published in the March 2018 issue of *The Journal of Nutrition*.

The researchers set out to investigate whether research, to date, collectively supports benefits of maternal or infant omega-3 supplementation on selected neurological outcomes. To do this, they searched multiple on-line databases housing peer-reviewed, scientific publications describing well controlled, randomized, omega-3 dietary intervention trials of at least 3 months in duration. To be included in their analysis, the mothers and infants had to be generally healthy, and the trials had to include outcome measurements related to cognitive, motor, or visual development. After removing those not fitting these criteria, the researchers ended up with 38 separate trials including 5541 participants. Data from these trials were then combined, and Mozaffarian and coworkers investigated their collective findings.

Results suggest that omega-3 supplementation improved motor development, particularly when the supplements were provided directly to the infants rather than to the mothers and the infants were born preterm. Vision was also improved when both full-term and premature infants were provided omega-3 oils. Supplementing mothers and infants with omega-3s did not appear to improve tests of overall intelligence later in life, but the researchers noted that few trials actually assessed these outcomes.

Reference Shulkin M, Pimpin L, Bellinger D, Kranz S, Fawzi W, Duggan C, Mozaffarian D. n-3 fatty acid supplementation in mothers, preterm infants, and term infants and childhood psychomotor and visual development: a systematic review and meta-analysis. *Journal of Nutrition* 2018 148:409-18.

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