THE INSTITUTE FOR FUNCTIONAL MEDICINE®

Pediatrics

Infants and Probiotics

An infant's **microbiome**—or, the internal ecosystem of beneficial bacteria and yeasts—begins developing immediately after birth. From birth to about 2 years of age, infants have specific bacteria in their microbiome and require specific strands of bacteria to keep their systems healthy. As is the case with adults, an infant's microbiome plays an important role in fending off infection and illness.

How Can You Help Your Infant Build a Healthy Microbiome?

Many different factors influence the microbiome. These include the type of delivery (i.e., vaginal or c-section), type of milk fed to the infant (i.e., breastmilk or formula), use of antibiotics and other medications, and even the components of the mother's microbiome during conception and delivery.

Delivery

Newborns delivered vaginally receive the first building blocks of their microbiome from their mother during delivery. As babies travel down the mother's birth canal, they are exposed to the beneficial bacteria that live there. Those beneficial strains of bacteria end up populating the digestive tract of the babies, laying the groundwork for healthy immune systems and microbiomes.

Babies who are delivered via c-section don't have as much exposure to healthy bacteria. All mothers who deliver via c-section are routinely given antibiotics during birth, which can deplete the beneficial bacteria babies need. Babies delivered via c-section also don't travel down the birth canal, so they miss that first important step in establishing a healthy microbiome.

While babies born vaginally receive almost all of their gut bacteria from their mothers, babies born via c-section acquire their gut bacteria from the environment and people they come into contact with immediately after birth. This means that the microbiomes of babies delivered via c-section aren't as diverse as those of babies born vaginally. However, research suggests that a simple "microbe wipe" procedure can increase the chances that babies born via c-section will build healthy microbiomes and immune systems. This procedure involves wiping the inside of a mother's vagina with a piece of gauze, and using that same piece of gauze to wipe down the baby's face, mouth, eyes, and skin after birth.

Breastfeeding

Research shows that about 30% of the beneficial bacteria in a baby's intestinal tract comes directly from the mother's breastmilk, and another 10% comes from the skin on the mother's breast. Additionally, babies continue to reap the benefits of exposure to beneficial bacteria via breastfeeding as long as they are being fed breastmilk. This establishment of a healthy gut microbiome in infants appears to protect against allergies, asthma, and inflammatory bowel disease throughout the infant's life.

For information on establishing a healthy microbiome when formula feeding, see the next page.

Formula Feeding and Probiotics

If breastfeeding isn't an option for mothers, beneficial bacteria can be added to formula in order to help infants establish a healthy gut microbiome and immune system. Ideally, probiotics for infants should be free of artificial ingredients and fillers and should include multiple strains of bacteria. However, the probiotics should utilize strains specifically found in the intestinal tract of infants. The *Lactobacillus* and *Bifidobacterium* species of bacteria (discussed in more detail below) are safe and effective in infant probiotic formulas.

Lactobacillus Species:

- *L. rhamnosus* promotes healthy bifidobacteria diversity in infants and is important for the normal maturation of an infant's immune system. *L. rhamnosus* GG (ATCC 53103) is a patented strain of *L. rhamnosus* more commonly known as Culturelle®.
- *L. casei* is essential for helping the infant immune system distinguish between dangerous toxins and pathogens vs. harmless antigens. *L. casei* increases IgA and is involved in digestion of gluten and dairy.
- *L. paracasei* can effectively protect against rotavirus, *Staphylococcus aureus*, and *Clostridium difficile*.
- *L. gasseri* is found in human breast milk and produces bacteriocins inhibitory to *Clostridium, Listeria,* and *Enterococcus*.
- *L. salivarius* normally colonizes the intestinal tract, enhances calcium absorption, and promotes normal intestinal barrier function.
- *L. reuteri* protects against colic, diarrhea, respiratory infections, and has been shown to reduce incidence of ADHD and anxiety in children.

Bifidobacterium Species:

- *B. infantis* is the strain that is most prevalent in infants and declines as we age. *B. infantis* reduces the risk of necrotizing enterocolitis in premature or low birth weight babies.
- *B. lactis* (also known as *B. animalis subsp. lactis*) enhances normal immune function by increasing numbers of total, helper, and activated T cells as well as IgA response to toxins.
- *B. bifidum* is one of the first strains of bacteria that colonize a baby's intestines and has better adherence to the intestinal wall than other strains. It suppresses IgE secretion, and its populations are often low in infants with allergies. *B. bifidum* is effective in reducing eczema, constipation and diarrhea.
- *B. longum* regulates the immune response to respiratory antigens.
- *B. breve* antagonizes rotavirus and reduces intestinal populations of anaerobic *Bacteroides* and *Clostridium*.

References

- Pannaraj, Pia S,M.D., M.P.H., Li F, PhD., Cerini C, M.D., et al. Association between breast milk bacterial communities and establishment and development of the infant gut microbiome. JAMA Pediatrics. 2017;171(7):647.

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