Early Life & the Microbiome

EARLY LIFE GUT MICROBIOTA PROFILES LINKED TO SYNBIOTIC FORMULA EFFECTS: A RANDOMIZED CLINICAL TRIAL IN EUROPEAN INFANTS

Lagkouvardos, I ; Intze, E ; Schaubeck, M ; Rooney, JP ; Hecht, C ; Piloquet, H ; Clavel, T
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With Expert Review from Wilma Kirsten

Microbial colonisation of the intestine after birth is a central event that influences infant health with life-long consequences. Although improvement of hygienic conditions reduces infant mortality due to infections, environments with low microbial biomass counteract natural colonisation by commensal microbes. The aim of this study was to assess the effects of a synbiotic intervention formula (IF) on faecal microbiota. This study was a multicentre, randomised, controlled, double-blind intervention trial which enrolled 540 infants. Infants whose parents had chosen not to breastfeed or were not able to breastfeed prior to study inclusion were allocated randomly to 1 of 2 formula groups (n = 230 control formula, n = 230 IF). The infants in the breastfed reference group (n = 80) were mainly fed human milk. Results showed that synbiotic intervention influenced the gut microbiota and milieu parameters during early life to resemble some major characteristics found in breastfed infants (higher relative abundances of bifidobacteria, lower richness, lower faecal pH and butyrate concentrations), and effects depended on the ecosystem profile of the infants.
Authors conclude that specific randomised, controlled studies that focus on infants born by Caesarean section and how early nutrition can support the beneficial development of their microbiota are needed.

EFFECT OF LACTICASEIBACILLUS PARACASEI N1115 ON IMMUNOMODULATORY AND GUT MICROBIAL COMPOSITION IN YOUNG CHILDREN: A RANDOMIZED, PLACEBO-CONTROLLED STUDY.

Li, P ; Ren, Z ; Zhou, J ; Zhao, A ; Wang, S ; Xun, Y ; et al.
Nutrients. 2023;15(8)

Cesarean section (C-section) is one of the most common obstetrical procedures, and China is among the countries with the highest C-section rates in the world. Lactobacillus is one of the well-known and most studied probiotics and has a broad distribution in the human oral cavity, genitourinary tract, gastrointestinal tract, and milk. The aim of this study was to investigate the efficacy of Lp N1115 as a probiotic on immunomodulatory and gut microbial composition in Chinese infants and toddlers born by C-section.
This study was a single-centre, randomised, triple-blind placebo-controlled trial. Infants and toddlers were randomly assigned to either the experimental group (Lp N1115 group) or the placebo-control group. Results showed that Lp N1115 can help maintain the intestinal pH of infants aged 6–24 months after C-section, improve immune function, and promote the proliferation of Lactobacillus. Furthermore, Lp N1115 could increase faecal secreted immunoglobulin A levels and, to some extent, reduce cortisol levels in infants and children. Authors conclude that supplementation with Lp N1115 enhanced Lactobacillus levels, particularly in 6–12-month-old infants.

EFFECT OF AN EXCLUSIVE HUMAN MILK DIET ON THE GUT MICROBIOME IN PRETERM INFANTS: A RANDOMIZED CLINICAL TRIAL.

Embleton, ND ; Sproat, T ; Uthaya, S ; Young, GR ; et al.
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Receipt of mother's own breast milk (MOM) is associated with lower rates of neonatal morbidities in preterm infants and improved long-term metabolic and neurocognitive outcomes. However, many experience a shortfall in MOM supply necessitating the use of either bovine formula or pasteurised human milk. The hypothesis of this study was that gut bacterial diversity and proportions of specific bacterial taxa would differ between trial groups as part of the mechanism by which exclusive human milk diets benefits preterm infants.
This study was a randomised clinical trial for which preterm infants in the first 72 hours of life (born less than 30 weeks of gestation) were recruited. Infants (n=126) were randomly assigned to standard (control) or exclusive human milk diet (intervention). Results showed that the intervention group had no overall effect on gut microbiome richness or Shannon diversity. Furthermore, Bifidobacterium relative abundance was not associated with an exclusive human milk diet. Authors conclude that their findings show that pasteurized human milk (or products derived from human milk) do not exert a major impact on gut bacteria when used in addition to MOM.

EFFECTS OF EARLY-LIFE ANTIBIOTICS ON THE DEVELOPING INFANT GUT MICROBIOME AND RESISTOME: A RANDOMIZED TRIAL.

Reyman, M ; van Houten, MA ; Watson, RL ; Chu, MLJN ; Arp, K ; et al.
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Disturbances of the gut microbial community composition after birth are associated with a broad spectrum of health problems in early infancy and later in life. The ecological side effects of antibiotics may be even more pronounced and persistent when administered in the early assembly phase of the neonatal gut microbiome in the first weeks of life. The aim of this study was to identify the antibiotic regimen with the least ecological and antimicrobial resistance (AMR) gene selection effects. This study was a randomised controlled study in 147 infants who required broad-spectrum antibiotics for treatment of (suspected) early-onset neonatal sepsis (sEONS) in their first week of life. Infants were randomly allocated 1:1:1 to three most commonly prescribed intravenous antibiotic combinations. Results showed that antibiotic-treated infants show temporarily reduced gut microbial diversity, and major and prolonged ecological perturbations, compared with healthy term-born controls. Furthermore, there was also a shift in AMR gene profile. Authors conclude that there are significant long-term effects of broad-spectrum antibiotic treatment. In fact, their findings suggest that more emphasis should be put on reducing the number of neonates that receive broad-spectrum antibiotics for sEONS.