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Neonatal intestinal microbiota factors

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ABSTRACT

Intestinal microbiota is a key element in maintaining health. Recently, the relationship between the microbiome and specific disease entities has been emphasized. A relationship between the composition of commensal flora and obesity, allergies, cancer and autism is suggested. Studies are available on factors that affect the formation of bacterial microflora in newborns. The pregnant microflora may affect the unborn baby. The study found the presence of bacteria in amniotic fluid, umbilical cord blood, placenta and fetal membranes. The microbiome of newborns born by caesarean section remove the one found on the mother's skin and function and in the operating room while the newborn born by nature pathways is close to the microflora of the mother's vagina. There was also a difference in the microbiome

of newborns born in the hospital and at home. Breastfeeding also affects the intestinal microflora. Mother's milk and infant faeces show the same bacterial strains. Intestinal dysbiosis may be the basis for a number of disease entities. It is necessary to know the prenatal and postnatal properties influencing the gastrointestinal colonization of the newborn. This knowledge will help develop guidelines favorable for normal colonization with microorganism of the neonatal intestines.

Key words: microbiom, labor, pregnant, breastfeeding

INTRODUCTION

Bacteria are present on the human skin and intestines. So they are in places where our body borders on the outside world. Gut bacteria play a role in digestion, vitamin production, and modulation of the immune system. Intestinal microbiota is a key element in maintaining health. Recently, the relationship between the microbiome and specific disease entities has been emphasized. A relationship between the composition of commensal flora and obesity, allergies, cancer and autism is suggested. It has been demonstrated that gut bacteria cross-communicate with the neuroendocrine and immune systems to effect a wide range of social and affective behaviors, including aggression and anxiety- and depression-like behaviors and brain development[1]. Rapid changes in human lifestyles over the past 100 years, including profound alterations in modern-day birthing practices, have the potential to transform our microbiome with unknown implications for health and predisposition to disease [2]. There are available studies on factors that affect the formation of bacterial microflora in newborns.

PREGNANT

The pregnant microflora may affect the unborn baby. The study found the presence of bacteria in amniotic fluid, umbilical cord blood, placenta and fetal membranes. Research indicates that the placenta may have its own bacterial flora [3]. The profile of neonatal microorganisms born to mothers with type 2 diabetes was similar to the complex intestinal bacteria of adults with this disease [4][5]. High-fat diet during pregnancy could negatively impact the early infant gut microbiota. [6]. Among children born by mothers experiencing high stress during pregnancy, there was a decrease in the number of *Lactobacillus* and an increase in *Proteobacteria* compared to newborns born to unstressed women [7].

LABOR

Antibiotics used before and during labor may interfere with the activity of the mother's microflora [8]. Many women take antibiotics during pregnancy, some of them cross the placenta and reach the fetus [9]. Antibiotics used in labor have the potential to increase the risk of fetal dysbiosis [10].

Hospital environment and interventions around the time of birth may affect the neonate microbiome.. Hospital-born infants having lower *Bacteroides*, *Bifidobacterium*, *Streptococcus*, and *Lactobacillus*, and higher *Clostridium* and *Enterobacteriaceae* family , than babies born at home [11].

Research indicates that a cesarean delivery increases the risk of metabolic diseases, asthma, allergies and neurodevelopmental problems in children [12][13][14][15]. Adults born via cesarean birth have fecal microbiome/microbiota that are distinctly different than those of

adults born vaginally [16]. The microbiome of newborns born by caesarean section remove the one found on the mother's skin and function and in the operating room while the newborn born by nature pathways is close to the microflora of the mother's vagina [17][18]. In order to take these differences into account, Dominguez-Bello and colleagues came up with the novel idea to transfer vaginal microbes from the mother to the caesarean-born neonate in an attempt to modulate NC, i.e. vaginal seeding (VS) [19]. Vaginal seeding is the practice of using cotton gauze or a cotton swab to transfer vaginal fluids to the mouth, nose or skin of a newborn. Research on this method used that in children who use this method, the microbiome was similar to those born by nature [19]. The risk of VS is likely low, but compared to vaginal delivery, VS is not a natural process, thus increasing the risk of complications. The hypothetical benefits of implementing vaginal seeding do not outweigh the potential risks [20].

BREASTFEEDING

The best food for a newborn baby is breast milk. It contains a number of natural oligosaccharides and various bacterial strains. Mother's milk and infant faeces show the same strains of bacteria. Babies fed exclusively on mother's milk are less colonized with *Clostridium difficile* and *Escherichia coli* compared to formula-fed newborns. The intestinal microflora of formula-fed babies contains up to 10 times less lactobacilli, while more bacteria from the genus *Bacteroides* and *Enterobacter* [21]. Research on probiotics and prebiotics present in breast milk may contribute to the development of better formulas of artificial milk that will affect the healthy development of the infant gut [22].

SUMMARY

Intestinal dysbiosis may be the basis for a number of disease entities. It is necessary to know the prenatal and postnatal properties influencing the gastrointestinal colonization of the newborn. This knowledge will help develop guidelines favorable for normal colonization with microorganism of the neonatal intestines. Natural childbirth, skin-to-skin contact and breastfeeding promote colonization of the newborn by the correct microflora. Therefore, efforts should be made to let as many mothers and newborns as possible experience it. This will have a positive effect on the further development of children.

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