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Probiotics in the modulation of maternal–infant immunity: Implications for allergic diseases

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ABSTRACT

Atopic diseases like asthma and allergies to various foodborne proteins are among the widespread chronic diseases in newborns because of their allergy-prone Th2-skewed immune response. Increasing scientific reports indicate that the mother's immune system plays a crucial role in mediating the development of fetal-infant immune responses. Lactating mammary glands are part of an integrated mucosal immune system with confined production of antibodies particularly targeted against pathogenic agents in the mother's environment and later encountered by newborns. Passive immunity through mother's milk is critical for a newborn's immune maturation. Thus, understanding the maternal influence of childhood atopic risk on newborn immune maturation could suggest novel treatment and prevention strategies. Probiotics have been proposed to harmonize Th1/Th2 imbalance in allergic diseases; however, the mechanism remains largely unknown. Feeding probiotics to mothers and offspring during the prenatal and postnatal periods to inhibit allergies in newborns may be a possible preventive approach in atopic diseases. Hence, the present review focuses on the role of feeding probiotics to mothers during pregnancy and lactation as well to newborns during suckling and post weaning periods as possible modulators for the activation of maternal infant immune response to downregulate the allergy-prone Th2-biased newborn system.

KEYWORDS

Adaptive immunity; immunomodulation; newborn; passive immunity; probiotics

Introduction

The prevalence of allergic diseases in newborns continues to increase worldwide.[1] It has been estimated that around 1–2% of the population, and up to 8% of children suffer from some type of IgE-mediated food allergy.[2] The spectrum of food allergy symptoms may include flushing, urticaria, angioedema, laryngoedema, diarrhea, nausea, vomiting, bronchospasm, or hypotension. However, no treatment has been hitherto shown to modify the natural course of the disease and no cure has been identified for it. The best way to prevent exposure to a food allergen is the complete avoidance of the offending food. For various reasons such avoidance may not always be possible.

Allergic diseases are now widespread in developed countries, and among the leading causes of chronic diseases in children, the involvement of environmental factors in allergy pathogenesis is strongly suggested.[3] Environmental factors such as an allergen exposure, virus, and smoking are important determinants in the development of allergy. The time

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