

THE INFANTILE DERMAL MICROBIOME: A REVIEW



Introduction

The neonatal gut and skin evolve parallelly, developing a blockade to the outside world and shaping the immune system. A possible connection between skin and gut is explained by exploring the role of probiotics in the prevention of atopic dermatitis (AD). A systematic review and meta-analysis showed that probiotic supplementation in both the pre- and postnatal period reduced the incidence of pediatric AD, but at the same time probiotics were not beneficial in treatment of pediatric AD. This gut-skin link in the prevention, but not treatment, of AD highlights the

significance of host-microbe interactions in the perinatal period. The cutaneous microbiome contains the microbes that live inside and on the skin, which then influence both infectious and inflammatory dermal conditions as well as immune system development. The composition of the dermal microbiome changes over the first year of life including the rapid colonisation that occurs at birth. The effectual state of the infant microbiome allows for pathology if evolution goes amiss, but also for opportunities to intercede, thereby preventing diseases.



Aim

To understand infant dermal microbiome and its relation to normal skin barrier development, and its contribution to 3 common skin conditions, which are as follows:

- Atopic dermatitis
- Seborrheic dermatitis
- Erythema toxicum neonatorum



Factors influencing the neonatal cutaneous microbiome:



Neonatal skin structure



Microbial diversity



From womb to the external world



Interaction between the microbes and immune system



The role of the dermal microbiome in pediatric skin diseases

Atopic dermatitis

Atopic dermatitis is a common, persistent skin condition that usually starts during early childhood. It is characterized by dry skin, intense itching, and a defective skin barrier, leaving patients at risk of infection. AD is a significant risk factor in the development of asthma and allergic rhinitis. Barrier dysfunction, inflammation, and microbes are major contributors to AD, and the relationship between AD and microbes is well established. While few healthy individuals are colonized with *Staphylococcus aureus*, 70% of patients with AD are colonized at lesional sites. Early exposure to *Staphylococcus aureus* reduces evolution of AD.

Seborrheic dermatitis

It is a common chronic inflammatory skin disease characterized by erythema with overlying greasy scales. Infantile SD prominently affects the scalp, neck, face, and diaper area. Exact etiology of SD is unknown but research studies have indicated a relation with lipophilic yeast *Malassezia*.

Erythema toxicum neonatorum

Erythema toxicum neonatorum is a common, benign neonatal skin condition consisting of pustules and papules on an asymmetrical erythematous base. This condition arises within days 2 to 4 of a child's birth and regresses unprompted within a week. Contusions occur commonly on buttocks, thighs and trunk.



Key take aways

Skin microbiome of an infant is diverse and dynamic and many factors play a significant role in shaping it. The unique relationship of skin barrier, immune function with the skin microbiome is a key to understanding advent of pediatric diseases in the future. Early intervention strategies may also help in prevention of dermatological pathologies.