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SKIN MICROBIOME IN ATOPIC DERMATITIS

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Atopic dermatitis (AD) is a chronic inflammatory skin disease. It has a complex pathogenesis and has a great influence on the socioeconomic domain as well as on patient's quality of life. Primary symptom of atopic dermatitis is pruritus. Factors that cause atopic dermatitis are epidermal barrier dysfunction, enhanced *Staphylococcus aureus* skin colonization, immunologic mechanisms, environmental and genetic factors.

Skin microbiome is a collection of microorganisms that inhabit the skin. It consists of both helpful and potentially harmful microorganisms. The latter includes *Staphylococcus*, *Corynebacterium*, *Streptococcus*, *Micrococcus* and *Propionibacterium*. When balance of microbiome is disrupted (a state known as dysbiosis), these bacteria can contribute to different skin disorders, such as atopic dermatitis, rosacea, seborrheic dermatitis and many others.

Pathophysiology of atopic dermatitis.

Recent studies show that loss-of-function mutations in the FLG gene contributes largely to the development of AD. FLG encodes skin protein filaggrin. It forms tight bonds between filaments of keratinocyte cytoskeleton by binding to keratins 1 and 10. This way cells collapse and flatten, which ends up in producing squames. Thus, the dysfunction of filaggrin production causes an increasing of skin pH and disturbance of epidermal barrier that leads to skin's invasion by chemical and infectious agents. It results in excessive immune response, which also impacts the epidermal barrier. Moreover, during AD the expression of antimicrobial proteins (AMPs) by keratinocytes is decreased. All these factors contribute to disruption of skin's microbiome balance and enhanced *Staphylococcus aureus* colonization, which makes AD a state of dysbiosis.

There are studies that show that the bacteria load is much greater on AD skin than it is on a healthy control skin. In addition, they also show that the severity of AD is also connected to the skin microbiome. It was identified that *S. aureus* absolute abundance is associated with increased severity of AD in adult patients.

Treatment of atopic dermatitis.

Treatment of atopic dermatitis is provided by supportive care, antipruritics, topical corticosteroids, calcineurin inhibitors, crisaborole, JAK inhibitors, phototherapy, systemic immunosuppressants, biologic agents and treatment of superinfections.

AD patients may benefit from the use of certain antibiotics in combination with topical medications, but there are many studies that noticed negative effects of antibiotics on microbiome and its beneficial part.

One of the best treatments is provided by the use of emollients and moisturizers. They can restore skin barrier and prevent relapses. Emollients decrease the population of *Staphylococcus* spp. on lesional and non-lesional skin.

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