

〈教育セミナー〉

第49回教育セミナー（2024）・「皮膚から“情報”を得る～ヒトの皮膚こそデータの宝庫～」

皮膚マイクロバイオーームとアトピー性皮膚炎
—病態から治療まで—

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**Skin Microbiota in Atopic Dermatitis:
From Dysbiosis to Therapy**

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Abstract

The skin microbiome consists of various microorganisms, mainly bacteria such as *Staphylococcus*, *Corynebacterium*, and *Cutibacterium*. These bacteria are adapted to the skin environment and help maintain skin health. The composition of the skin microbiome differs by body site, age, and development, and remains relatively stable in healthy adults.

In atopic dermatitis (AD), the balance of the skin microbiome is disrupted. A major feature is the increased presence of *Staphylococcus aureus* on affected skin. This imbalance, or dysbiosis, is associated with worsened inflammation and reduced microbial diversity. New techniques, such as Next Generation Sequencing, have shown that *S. aureus* may not just grow because of inflammation—it may also cause it.

One important mechanism is quorum sensing (QS), a system bacteria use to detect their population density and coordinate behavior. In *S. aureus*, Agr-QS controls the production of toxins that damage skin cells and trigger immune responses, such as itching and inflammation.

Some beneficial skin bacteria, like *Staphylococcus epidermidis*, can block *S. aureus* QS signals, possibly protecting the skin. Early skincare using moisturizers may also help shape a healthier microbiome. For example, infants who developed AD had lower levels of *Cutibacterium acnes*, a bacterium that may help strengthen the skin barrier. New treatments aim to reduce *S. aureus* harm by blocking QS or supporting beneficial bacteria. Understanding the skin microbiome offers new ways to prevent and treat AD, especially in early life.

Key words: skin microbiome, atopic dermatitis, *Staphylococcus*, quorum sensing.