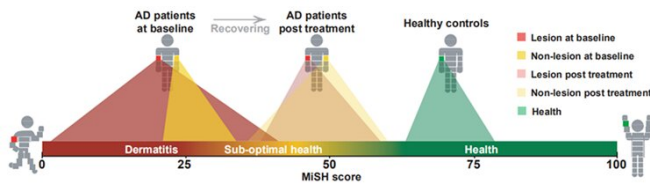


# Scientists use skin's microbiome to develop health index for children with eczema

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Credit: CAS

Microbiomes aren't just for understanding and modulating gut health—skin, our largest organ, hosts a vibrant and complex microbiome that can provide health insights. An international research team has developed an index to better understand skin health across human populations.

They published their results on August 20 in *mSystems*, a journal issued by the American Society for Microbiology.

"A central goal of human [microbiome](#) projects is to diagnose and predict the human's healthy or unhealthy state via the microbiome," said Xu Jian, senior author and director of the Single-Cell Center and Shandong Key Laboratory of Energy Genetics at the Qingdao Institute of Bioenergy and Bioprocess Technology (QIBEBT) of the Chinese Academy of Sciences (CAS).

In guts, the composition of microbes present can indicate health and diet issues. In [skin](#), it can operate the same way. Xu noted that by understanding the [skin microbiome](#), researchers can also predict how the skin may react to specific treatments.

The issue, though, is that skin microbiome differs between [human populations](#) due to environment, health status, body locations, diet and other mitigating factors.

"Due to the variance, the ability to use skin microbiome as an indicator of [skin health](#) that applies across large geographic ranges has remained largely unexplored," Xu said. "As such, the central question of this study is: can we harness the talent and power of our skin microbiome for precise skin care, such as diagnosis and treatment?"

To answer this question, the international team which consists of CAS, Procter & Gamble, UCLA and UCSD assessed children with healthy skin and those with Atopic Dermatitis (eczema), the irritating skin condition that causes the skin to turn red and itch. Eczema affects 15 to 30 percent of children around the globe, so the researchers examined children in three different cities: Beijing and Qingdao in China, and Denver, Colorado in the United States. Qingdao is a coastal city approximately seven hours drive north of Beijing. Denver is a mountain city, with a higher elevation than the other two cities.

In these vastly different locations, the researchers identified 25 bacterial genera—the taxonomic ranking above species—in the skin microbiomes of children and developed a Microbial index of Skin Health (MiSH).

According to Sun Zheng, the first author of the paper, this index can identify skin conditions, such as eczema, and has implications in clinical settings. Currently, eczema is identified via a scaling system where a physician observes a patient with multiple symptoms that add up to eczema. MiSH identifies it with an 83 to 95 percent accuracy within each city and with 86.4 percent accuracy across all cities.

"MiSH can quantitatively assess pediatric skin health across cohorts from distinct countries over large geographic distances," Sun said, explaining that index serves to compare skin health via the microbes that live on the skin. "MiSH can identify a risk-prone skin state and predict treatment effect in

children, suggesting applications in patient stratification and personalized treatment in the clinics and in the skin care industry."

Next, the researchers plan to further study the mechanisms by which the index helps predict skin [health](#) and refine how well it predicts treatment response in larger and wider cohorts.

**More information:** Zheng Sun et al, A Microbiome-Based Index for Assessing Skin Health and Treatment Effects for Atopic Dermatitis in Children, *mSystems* (2019). [DOI: 10.1128/mSystems.00293-19](#)

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