A Mixed Community of Skin Microbiome Representatives Influences Cutaneous Processes

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Keywords: Skin microbiome, skin proliferation, host-microbiome interaction, RNA sequencing, cutaneous transcriptome, human microbiome, human skin equivalents, Microbiome, skin

Posted Date: February 25th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-276074/v1>

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Abstract

Skin, the largest organ of the human body by weight, hosts a variety of microorganisms that can influence health. Skin microbes play a role in immunity, wound healing, colonization resistance, and skin disorders. Unfortunately, while mouse models have uncovered some host pathways influenced by skin microorganisms, more studies are needed in healthy human skin. A recent study uses a 3D skin tissue model – human skin equivalents – to study the effects of the microbiome on skin health. Researchers introduced bacterial isolates from healthy individuals to an in vitro skin model. Transcriptomics demonstrated that microbial presence on 3D skin tissue significantly altered patterns of gene expression in particular influencing genes involved in apoptosis, proliferation, and the extracellular matrix. Microbes also affected the thickness of the epidermal layer reduced the number of actively proliferating cells and increased filaggrin expression. The changes were more pronounced upon treatment with the mixed microbial community, while single microorganisms did not have the same effect. These results suggest that while it is important to understand how individual microbes affect a host the skin microbiome is more than the sum of its parts, with the full community having a unique effect on skin health.