

Research and Development

Shiseido Succeeds in 3D Visualization of Immune Cells with the Development of Its Optical Clearing Technique, Accelerating Elucidation of Skin Immune Function

Contributing to the further development of immunity research
toward the realization of inherent skin beauty

Shiseido has succeeded in the comprehensive, three-dimensional (3D) observation of immune cells present in the skin, covering all layers from the epidermis, dermis, and subcutaneous tissue, with the development of its patented, proprietary optical clearing technique that makes skin tissue transparent (Figure 1). The skin, referred to as the largest immune organ in the human body, contains in abundance a wide range of immune cells. However, the conventional two-dimensional local observation technology has only allowed the generation of limited information. The 3D visualization technology developed in this research enables comprehensive observation, thereby providing a deeper understanding of the role of skin immunity that factors in the spatial arrangement and the network of immune cells. It is expected that this will lead to the elucidation of new immune functions.

Based on the idea of preventing future skin problems with the power of the skin itself, Shiseido has advanced research focusing on the importance of immunity for skin health for more than 30 years. Moving forward, the company aims to create value that realizes the inherent beauty of the skin, not bound by age, by further developing skin immunity research and taking care of immune cells.

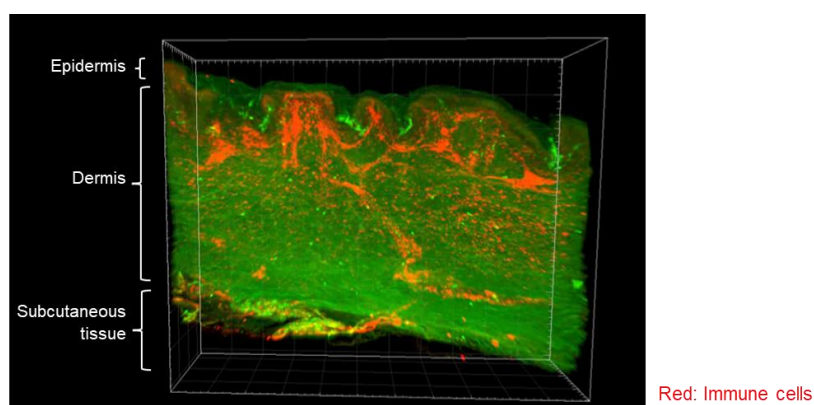


Figure 1. Comprehensive 3D observation of immune cells in the skin, including the epidermis, dermis, and subcutaneous tissue

The latest skin immunity research

•Research as a result of 30 years of collaboration between Shiseido and CBRC reveals a novel mechanism by which skin's immune cells eliminate senescent cells (2024)

<https://corp.shiseido.com/en/news/detail.html?n=00000000003896>

•Shiseido makes the world's first discovery of the effect of Fermented Camellia Seed Extract to promote the expression of a factor that recruits senescent cell-eliminating immune cells (2024)

<https://corp.shiseido.com/en/news/detail.html?n=00000000003899>

About our R&D strategies:

This study was conducted under "Skin Beauty INNOVATION," one of the three pillars of Shiseido's R&D strategies, to clarify the relationship between the skin and its internal condition such as blood vessels, lymph vessels, immunity, and nerves.

• Integrated Report 2023 (Beauty Innovation)

<https://corp.shiseido.com/report/en/2023/message/cmio/>

• Keywords

Skin Beauty INNOVATION, skin immunity, visualization technology

References: Shiseido's previous research results on immunity

• Research on skin immunity at Shiseido creates a new field of skin physiology (1993)

Published in scientific journal Nature; May 13, 1993

• Discovery: a new mechanism of skin trouble (2007)

Published in scientific journal J Invest Dermatol 2007; 127:362–371

• Developing a multiple solution that acts directly on Langerhans cells and enhances skin immunity (2014)

https://corp.shiseido.com/en/newsimg/archive/00000000001651/1651_f1j63_en.pdf

• Shiseido Clarifies Underlying Mechanism of Age-Related Changes in Skin Immunity (2020)

<https://corp.shiseido.com/en/news/detail.html?n=00000000002984>

Published in scientific journal J Invest Dermatol 2020; 140:1327–1334

• Shiseido elucidates the mechanism by which male hormones reduce skin immunity (2020)

<https://corp.shiseido.com/jp/news/detail.html?n=00000000003031> (Japanese)

• Cytotoxic CD4+ T cells eliminate senescent cells by targeting cytomegalovirus antigen

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DOI: <https://doi.org/10.1016/j.cell.2023.02.033>

• Shiseido discovers the possibility that ectoine promotes melatonin synthesis and leads to enhanced immune function of the skin (2023)

<https://corp.shiseido.com/jp/news/detail.html?n=00000000003680> (Japanese)

• Shiseido discovers that the skin of people with well-functioning immune systems is less susceptible to the effect of disrupted sleep (2023)

<https://corp.shiseido.com/jp/news/detail.html?n=00000000003696> (Japanese)

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