November 2026
Shiseido Company, Limited

Press Release

Research and Development

Shiseido Discovers "Duct Hub," a Distinctive Structure Deep Within Pores, as a Factor in Adult Pore Enlargement and Sagging

Proprietary Technology Enables Two Active Ingredients—Glycylglycine and Niacinamide—to Penetrate Deep into the Skin, Tightening Pores

Shiseido Company, Limited (“Shiseido”), using proprietary non-invasive observation and analysis technology, discovered that the "Duct hub*1,2," a tubular structure deep within pores, enlarges in "adult pores"—pores characterized by age-related enlargement and sagging. Shiseido also found that collagen is specifically reduced around the Duct hub and that the dermal extracellular matrix (ECM) is weakened, identifying this as one of the factors contributing to Duct hub enlargement. On the basis of this discovery, Shiseido concluded that the root cause of adult pores lies in the Duct hub deep within the pore. To improve the appearance of adult pores, it is essential not only to take the conventional approach targeting the skin's surface, but also to promote active ingredients penetrating the Duct hub. By combining its proprietary delivery-enhancing agent AB/XY complex*3, which enhances penetration of pharmaceuticals into the skin, with the active ingredients glycylglycine and niacinamide, Shiseido confirmed that the active ingredients reached the Duct hub, improving the appearance of adult pores (Figure 1).
Through this research, Shiseido made it possible to ease pore concerns among adults by moving beyond conventional, superficial approaches and addressing them at a deeper level. Shiseido will continue to advance “Pore aging science” and demonstrate the relationship between pore concerns and aging.
The findings of this research were presented at the 36th IFSCC*4 Congress in Perth, Australia (September 2026).

*1 "Duct hub" is a trademark or registered trademark of Shiseido Company, Limited.
*2 Shiseido named the luminal structure inside the pore—extending from immediately below the epidermal basement membrane to above the sebaceous gland—"Duct hub."
*3 Shiseido Develops New Delivery-Enhancing Agent that Markedly Promotes Skin Penetration of Pharmaceuticals (2022) （Japanese only） https://corp.shiseido.com/jp/newsimg/3496_d6o45_jp.pdf
*4 The International Federation of Societies of Cosmetic Chemists

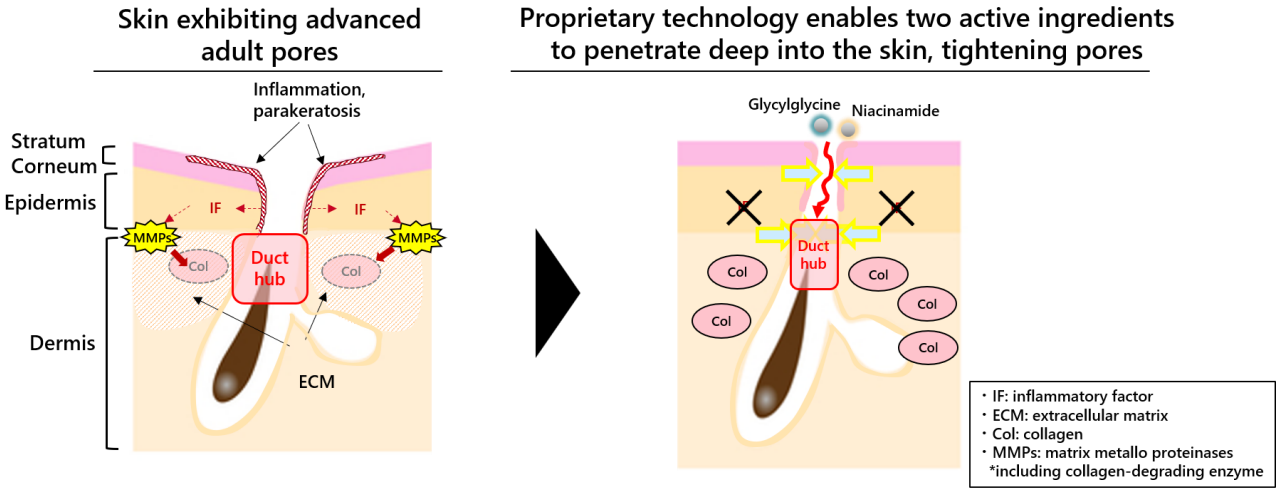


Figure 1 Two active ingredients reach the Duct hub—the root cause of adult pores—tightening pores deep within.

Research Background

Pore-related concerns rank among consumers' top skin concerns, particularly in Japan and other parts of Asia. However, several aspects of pore-related skin physiology remain unclear, and no fundamental solutions have yet been found. Shiseido was among the first to investigate this topic when academic research on pore structure and skin physiology was scarce, elucidating the mechanisms underlying visible pores and discovering the active ingredient glycylglycine*[5]. Recognizing consumer awareness that skin with noticeable pores may cause people to look older than they are, Shiseido conducted research into adult pores, where this concern becomes even more pronounced. Unlike other tissues making up the skin, pores have a distinctive structure that extends deep into the skin. Therefore, Shiseido hypothesized that the key to fundamentally improving pore-related concerns lies within the deep layers of pores.

*5 24th IFSCC Congress in Osaka (2006), Poster Award: "How Can We Improve the Appearance of Conspicuous Facial Pores?"
https://corp.shiseido.com/en/rd/ifscc/13.html

Discovery of Duct Hub Enlargement in Adult Pores

To observe conditions deep within pores, Shiseido further advanced its proprietary Skin Elasticity Imaging Technology*[6] and developed new, non-invasive technology that uses an ultrasound microscope to visualize deep pore structures. Generally, analyzing internal skin conditions requires tissue excision and examination. However, a key feature of this technology is that it allows non-invasive observation of the skin's internal structure in living tissue. Furthermore, although it was previously difficult to accurately observe deep layers of the pores owing to the sensitivity limitations of conventional equipment, by devising ways to optimize the probe (the device tip) applied to the area under observation and the method of data analysis, high sensitivity was achieved, enabling observation down to the deep layers of pores. Using this technology, Shiseido compared inconspicuous pores with adult pores, pores on the skin surface were enlarged and sagging, and the Duct hub directly beneath the basement membrane was also enlarged (Figure 2).

*6 Shiseido Succeeds in Visualization of Internal Skin Elasticity (2018)（Japanese only）
https://corp.shiseido.com/jp/newsimg/2422_y2k40_jp.pdf
Shiseido Discovers that Balance of Internal Skin Elasticity is Root Cause of Wrinkles (2021)
https://corp.shiseido.com/en/newsimg/3074_l4h08_en.pdf

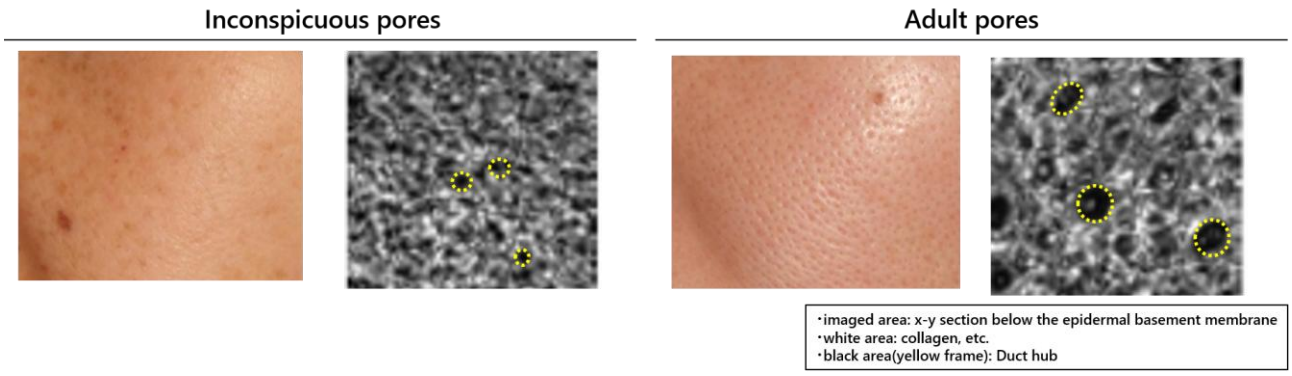


Figure 2 Difference in Duct hub size between inconspicuous pores and adult pores

Uncovering the Mechanism Underlying Duct Hub Enlargement

Next, Shiseido investigated the mechanism underlying Duct hub enlargement. Close examination of adult pores revealed that collagen was specifically reduced around the Duct hub in the dermal layer, and the surrounding dermal ECM was weakened (Figure 3).

Furthermore, previous research by Shiseido showed that people with noticeably enlarged pores have significantly higher sebum levels, particularly a high proportion of unsaturated fatty acids. Unsaturated fatty acids are known to promote parakeratosis*[7]. In the present research, Shiseido found that in adult pores, parakeratosis occurs not only on the pore surface but also deep within the Duct hub. This suggests that unsaturated fatty acids increase inflammatory factor production around the Duct hub, elevate collagen-degrading enzyme expression, and reduce collagen in the dermal ECM.

These findings indicate that improving the appearance of adult pores requires active ingredients to reach not only the pore surface but also the Duct hub deep within the pore.

*7 A condition caused by inflammation, irritation, or similar factors, in which the differentiation and proliferation of skin cells are disrupted, leading to abnormally rapid keratinization, resulting in incomplete cells—with nuclei still present—appearing on the skin surface. (The nuclei are absent in keratinocytes on the surface of normal skin.)

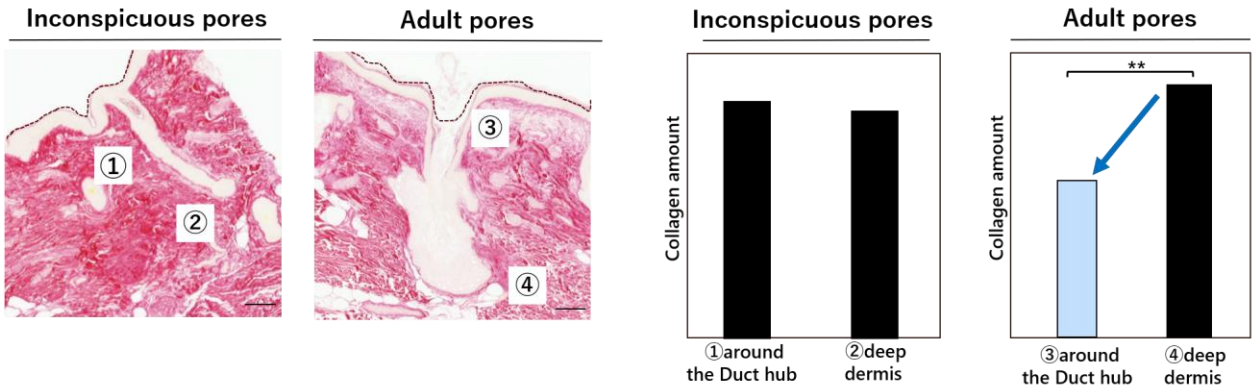


Figure 3 Collagen specifically decreases around the Duct hub of adult pores

Proprietary Technology Enables Delivery of Two Active Ingredients Deep into the Duct Hub to Improve Pore Appearance

In this research, Shiseido narrowed down the active ingredients to those capable of addressing collagen reduction around the Duct hub and selected niacinamide, which boosts collagen production, and glycylglycine, which suppresses inflammatory factors. As adult pores worsen, incomplete keratinization occurs within the Duct hub, releasing inflammatory factors. Because these factors promote collagen breakdown, glycylglycine, which effectively suppresses them, is expected to help prevent Duct hub enlargement.

By combining glycylglycine and niacinamide with the AB/XY complex, Shiseido's proprietary delivery-enhancing technology, we achieved enhanced skin penetration and more efficient delivery of the active ingredients to the Duct hub deep within the pores*8 (Figure 4). As a result, enlarged, sagging adult pores improved in appearance (Figure 5).

*8 Shiseido Enhances Functionality and Safety of Cosmetic Products by Visualizing Penetration and Distribution of Active Ingredients in the Skin with Cell-Level Resolution (2024)
https://corp.shiseido.com/en/newsimg/3768_i8h75_en.pdf

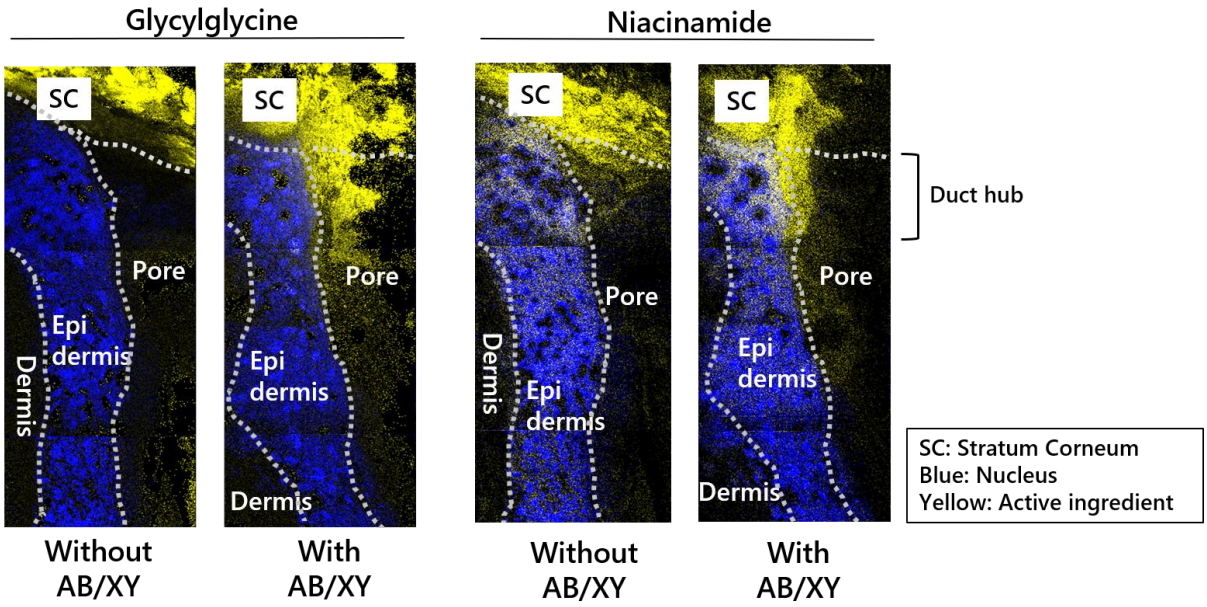


Figure 4 Shiseido's proprietary delivery technology enables not only the delivery of active ingredients to the skin surface but also their penetration into the Duct hub deep within pores

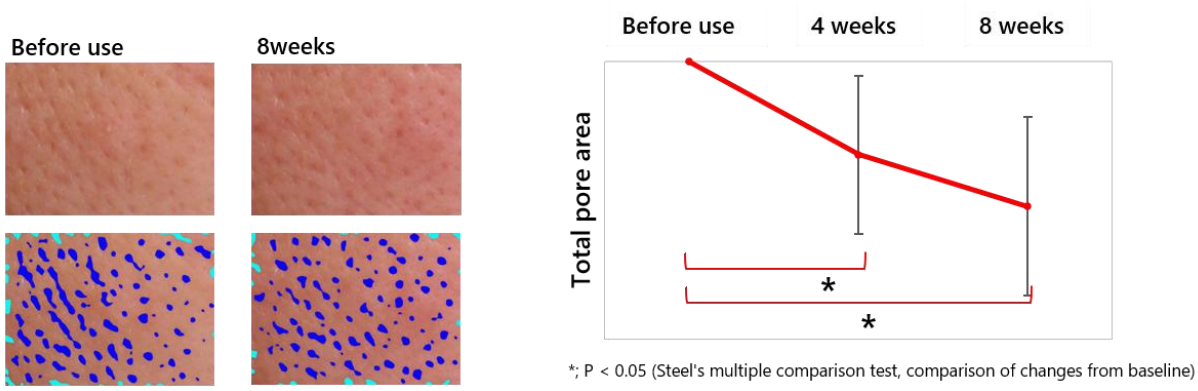


Figure 5 Significant improvement in appearance of enlarged adult pores, achieved with two active ingredients and a delivery technology

Future Prospects

This research focused on the deep layers of pores and identified the root cause of adult pores. Because pore concerns are not merely superficial but closely linked to the skin's internal condition, they may also be related to other aging-related factors. Shiseido will continue to advance “Pore Aging science” and, by uncovering the relationship between pore concerns and aging, aims to develop an approach that will not only advance research on adult pores but also contribute to future aging prevention.

Researcher



Yu Yanagihara

MIRAI Technology Institute
Shiseido Company, Limited

R&D Strategy

Shiseido has established three pillars under its R&D philosophy “DYNAMIC HARMONY” to accelerate innovation: “Skin Beauty Innovation: Equity enhancement of brands,” “Sustainability Innovation: Circular value creation,” and “Future Beauty Innovation: Challenges in new areas.” Additionally, Shiseido promotes open innovation and advances new value creation through research alliances with various external organizations. The innovative research outcomes generated from the fusion of Shiseido's advanced science and the knowledge and technology of world-class research institutions are highly regarded academically on a global scale, including at the IFSCC Congress, the world's largest and most prestigious research conference on cosmetic technology.

About R&D Philosophy “DYNAMIC HARMONY”
https://corp.shiseido.com/en/rd/dynamicharmony

Related press release

・Scientific Analysis of Pore-Related Skin Properties（2003）（Japanese only）
https://corp.shiseido.com/jp/newsimg/archive/00000000000373/373_n3c34_jp.pdf