

Press Release

Research and Development

**Shiseido's world's first discovery of OBP2A present in nose to express in human skin
and protect skin from odor particles**

Achieving healthy and beautiful skin with French white lily flower extract

As a new mechanism for maintaining the skin's health and beauty, Shiseido discovered for the first time in the world that OBP2A^{*1}, an odorant binding protein, contributes to the maintenance of homeostasis in the human epidermis and plays a part in the epidermal barrier (Figure 1). OBP2A, which is found in the inner part of the human nose, is known to have the function to filter out stress molecules that damage cells. In the present study, Shiseido revealed that OBP2A is also expressed in the epidermis. Moreover, the "French white lily" flower extract was identified as an ingredient that enhances the expression of OBP2A. Shiseido aims to provide solutions that lead to healthy and beautiful skin that can withstand any environment.

*1. Odorant binding protein 2A

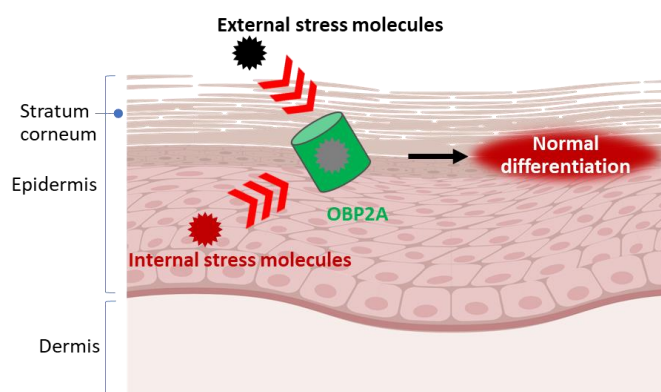


Figure 1: OBP2A is also expressed in the epidermis, where it filters stress molecules that cause damage to the skin and maintains normal differentiation of the skin

Research Summary

In this study, when the skin was immunostained, it was found that OBP2A are also present in the epidermis (Figure 2).

Moreover, the addition of nonenal^{*2}, an odor component found in the environment (external stress molecule), and oleic acid and palmitoleic acid, which are components of sebum, sweat, etc. (internal stress molecules), to epidermal cells with low OBP2A levels caused a decrease in defense against stress molecules, resulting in a lowered cell survival rate (Figure 3). Furthermore, in the epidermal model with reduced OBP2A, the thickness of the epidermal layer was found to be decreased, with a reduction in the secretion of lamella granules (skin moisture component). In addition, the epidermal barrier function was impaired due to an increase in epidermal water loss.

Besides these findings, the search for ingredients that can increase the level of OBP2A expression led to the discovery of the French white lily flower extract from the Madonna Lily flower (a plant in the lily family), having the effect of increasing the expression of OBP2A in the epidermis, increasing the epidermal thickness, reducing the water loss, and enhancing the epidermal barrier function.

Shiseido has been conducting research on the function of the skin to self-recognize substances that stimulate five senses. By elucidating the inherent power of the skin and strengthening its function, we aim to achieve healthy and beautiful skin that can withstand any environment. The results of this study were partly presented as a selected oral presentation at the Gordon Research Conference^{*3} (2023/8/6-8/11), an international research conference with a long history and authority in the field of science.

*2. The main component of the peculiar odor that occurs with aging (aging odor). Shiseido has found that nonenal also causes damage to the skin.

Shiseido discovers for the first time in the world that nonenal causes skin damage (2021)

<https://corp.shiseido.com/jp/news/detail.html?n=0000000003114> (Japanese)

*3. The international scientific conference that has been held by the Gordon Research Conference (nonprofit organization) since 1931.

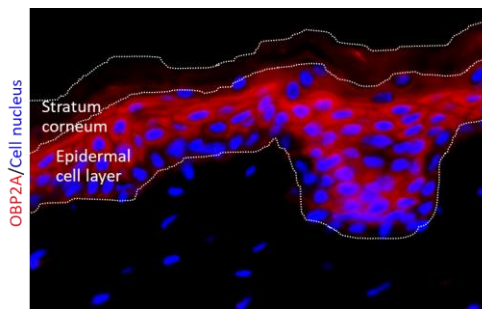


Figure 2: OBP2A (red part) is also expressed in the epidermis

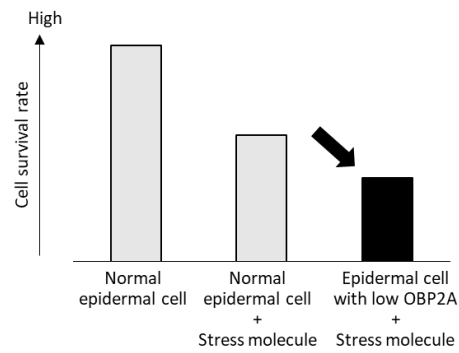


Figure 3: Addition of stress molecules to epidermal cells with low OBP2A levels reduces cell survival rate

About our R&D strategy:

Under "Skin Beauty INNOVATION," one of the three pillars of Shiseido's R&D strategy, this study was conducted by applying basic dermatological research that elucidates the relationship between the skin and its internal condition to identify high-level functions that the skin possesses, what could be called 'skin intelligence.'

- Integrated Report 2023 (Beauty Innovation)

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

- Keywords

Skin Beauty INNOVATION, basic dermatology, OBP2A, epidermis

<Reference>

Researchers' challenges

■ R&D Philosophy "DYNAMIC HARMONY" approach

This research was carried out under the Inside/Outside approach of Shiseido's R&D philosophy, DYNAMIC HARMONY. By elucidating and strengthening the new relationship mechanism between the skin and the environment, we aim to realize healthy and beautiful skin that can withstand any environment.

■ Elucidation of the skin's protective mechanism

The skin is constantly exposed to numerous low-molecular environmental substances that are invisible to the human eye, which can cause damage to the skin. We believe that elucidating and strengthening the inherent protective power of the skin will help us lead to the maintenance of healthy and beautiful skin in all environments. This time, we focused on the protein OBP2A, which exists in the nose and is thought to protect olfactory cells by filtering out stress molecules, in addition to capturing odor molecules. We advanced our study with a hypothesis that OBP2A may also exist in the epidermis.

■ Skin is the largest organ in the human body in direct contact with the environment

Our skin is constantly sensing changes in the environment and trying to maintain homeostasis based on that information. In the modern world, we are exposed to continuous environmental changes such as abnormal weather and air pollution, and this ability to sense the environment, which can be called 'skin's intelligence,' is very important. On the other hand, there are also environmental factors that are beneficial for the skin. Therefore, it is important that the interaction between the skin and the environment is well balanced. Our challenges lie in providing values that transform not only the skin but also the surrounding environment to be beneficial for the skin.



Researcher Shinobu Nakanishi