

Press Release

Research and Development

Shiseido develops a unique mixture of extracts that prevents thinning of the dermis, a phenomenon caused by aging

~Research advance made possible by the success of three-dimensional skin model creation using knowledge of regenerative medicine research~

Shiseido has succeeded in reproducing a "thinning" phenomenon, which is characterized by a decreased thickness of the dermis caused by aging, using a three-dimensional (3D) skin model by leveraging the know-how for cell experiments gained from regenerative medicine research. In the search for ingredients that prevent the thinning of the dermis, the company's original mixture of extracts consisting of *Lonicera japonica* flower extract, safflower extract, and *Bupleurum* root extract was found to have some effects. The extract mixture will be applied to our skin care products. Shiseido will continue to provide solutions to address aging concerns that many customers have, such as wrinkles and sagging. The results of this study were orally presented in part at the 94th Annual Meeting of the Japanese Tissue Culture Association (July 7-8, 2022).

Research background

The development of methods to prevent or improve wrinkles and sagging, which are typical signs of aging, has long been desired as they represent major concerns related to aging. In response to such customer concerns, Shiseido has been engaged in research on skin aging for many years and has yielded ample knowledge, including the association between dermal stem cells and sagging^{*1} and the mechanism by which immune cells eliminate senescent cells in the skin. Thinning of the dermis is a phenomenon observed with aging, and it causes a loss of elasticity and weakening of the entire skin, leading to formation of wrinkles and sagging. This time, Shiseido took on a challenge to develop a 3D skin model that reproduces the thinning of the dermis caused by aging in order to capture changes in the skin structure in detail and elucidate the precise mechanism underlying this phenomenon.

*1 Shiseido Clarifies "Propagation of aging" in the Inner Skin (2018): <https://corp.shiseido.com/en/news/detail.html?n=0000000002569>

Development of a 3D skin model that allows for reproduction of thinning of the dermis

In the present study, Shiseido used its original dermal senescent cell model^{*2}, which was developed with technologies the company has cultivated over years of regenerative medicine research and has made it possible to reproduce the characteristics of senescent cells such as overgrown cell size, cessation of cell proliferation, and detection of senescence markers, to develop a 3D skin model. The developed 3D skin model allowed for observation of age-related changes in the structure of the dermis, termed "thinning of the dermis," which had been difficult to reproduce until now.

*2 Shiseido Succeeds in Developing a "Dermal Senescent Cell Model" to Explain Cause of Propagation of Aging (2022):

<https://corp.shiseido.com/jp/news/detail.html?n=0000000003453> (japanese only)

Development of ingredients that prevent thinning of the dermis

Thinning of the dermis is known to occur as a result of progressing decomposition of the extracellular matrix, which is composed of components such as collagen and elastin. Using the developed 3D skin model, we searched for ingredients that have the effect of improving the thinning of the dermis, and discovered that our original extract mixture consisting of *Lonicera japonica* flower extract, safflower extract, and *Bupleurum* root extract had an effect to prevent the thinning of the dermis in the 3D skin model.

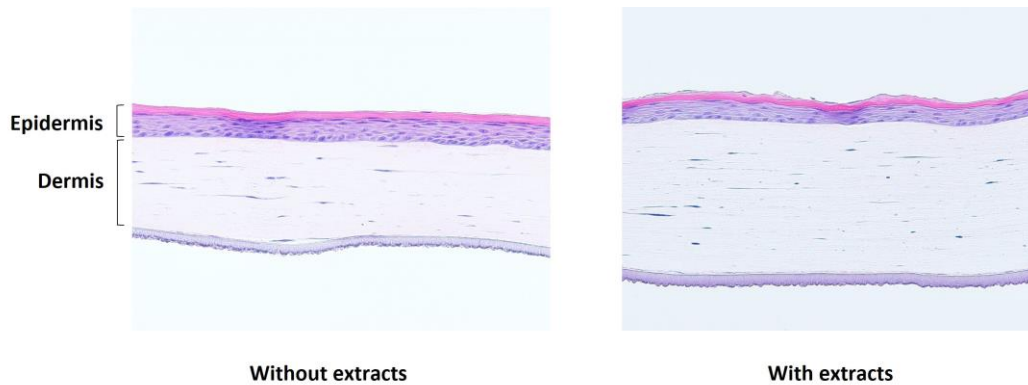


Figure 1 Thinning of the dermis is improved by the addition of the original extract mixture

In addition, as we investigated further the effect of our original extract mixture to improve the thinning of the dermis, we found that it had a suppressive effect on the gene expression of MMP1 (matrix metalloproteinase 1), a type of extracellular matrix degrading enzymes.

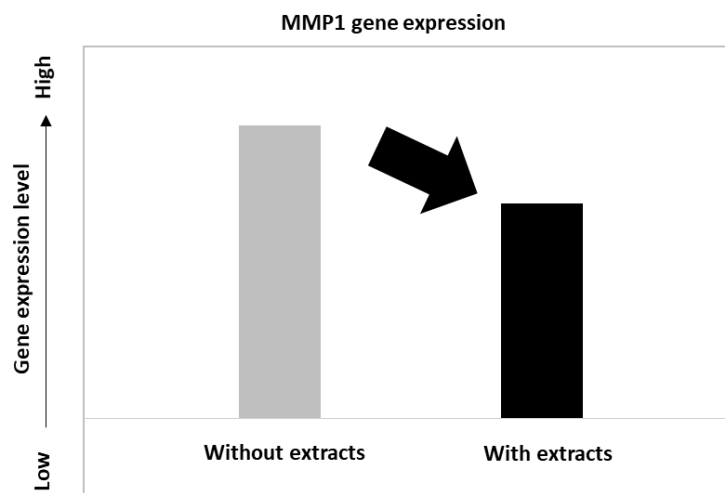


Figure 2 MMP1 gene expression level decreases in the presence of the original extract mixture

Summary and Future Prospects

The results of this study demonstrate that it is now possible to observe changes in the structure of the dermis associated with aging, i.e., the thinning of the dermis, which has been difficult to study in detail. We also achieved the identification of ingredients that can prevent this phenomenon. By applying these results, we will provide solutions to address aging signs that many of our customers are concerned about, such as wrinkles and sagging, beyond their expectation.

About our R&D Strategies:

This study was conducted with the aim of elucidating the causes of "eternal skin concerns" that our customers have been expressing for many years, including dark spots/dullness, wrinkles, sagging, and pores, and developing solutions under "Skin Beauty INNOVATION," one of the three pillars of Shiseido's R&D strategy.

- Integrated Report 2022 (Beauty Innovation Part)
https://corp.shiseido.com/report/en/2022/value_creation/innovation/
- Keywords
 Skin Beauty INNOVATION, eternal skin concerns, wrinkles, sagging

R&D Philosophy "DYNAMIC HARMONY" approach

The present study has been conducted under the Inside/Outside approach of "DYNAMIC HARMONY," Shiseido's unique R&D philosophy. By developing and utilizing technologies that allow for more detailed observation of the aging process inside the skin, we will continue to provide an innovative beauty experience to prevent aging signs that appear on the surface of the skin in unprecedented ways.