

Shiseido Has Developed an Ingredient for Improving Skin Quality that Protects Skin from External Stresses such as Ultraviolet Rays

Shiseido has discovered that the protein “Serpín b3” is a factor in blocking the barrier function that protects our bodies from external stresses such as dryness and ultraviolet rays^{*1} and has independently developed the amino acid derivative “1-piperidine propionic acid,” which is an effective ingredient for inhibiting production of this protein.

Mechanism and Mystery of Stratum Corneum Formation

The stratum corneum, which is the uppermost layer of the epidermis of human skin, possesses a barrier function to protect skin from a number of external stresses such as dryness and ultraviolet rays. While a normal stratum corneum matures by its formation associated with nuclei digestion of epidermal cells, the epidermal barrier function is significantly impaired in cases where **the nuclei are present** in corneocytes due to whatever cause. Although this phenomenon previously has been known, what factor is involved in nuclei digestion and its mechanism has long remained unexplained; therefore, no effective method of dealing with this issue has been found.

Discovery of the Protein “Serpín b3” as a Causative Factor of Rough Skin

Shiseido clarified the mechanism of nuclei digestion and discovered that “Serpín b3” is a factor in inhibiting the formation of a normal stratum corneum. Although “Serpín b3” is seldom observed in a normal epidermis, it is markedly increased in the epidermis of **rough skin**. As a result of biochemical analysis, it was proven that increased “Serpín b3” inhibits nuclei digestion of corneocytes and significantly disturbs stratum corneum formation.

The amount of “Serpín b3” varies greatly according to each person. By analyzing the epidermis of approximately 2,000 people all around the world, Shiseido found that there is a strong correlation between the amount of “Serpín b3” and the corneocytes with nuclei as well as the amount of “Serpín b3” and the epidermal barrier function. In addition, the amount of “Serpín b3” also correlates with the skin’s susceptibility to external stresses.

Development of Ingredient “1-Piperidine Propionic Acid” that Inhibits “Serpin b3”

Based on the idea that resilient skin resistant against external stress can be realized by inhibiting production of “Serpin b3,” Shiseido embarked upon developing an ingredient focusing on substances in living organisms. Accordingly, Shiseido made the world’s first discovery that “1-piperidine-propionic acid” alanine derivative, one type of amino acid, has an inhibitory effect on the production of “Serpin b3.”

Effectiveness of Amino Acid Derivative “1-Piperidine Propionic Acid”

When ultraviolet rays are irradiated on normal skin or a skin model cultivated from skin cells, a significant increase of “Serpin b3” as well as abnormalities such as remaining nuclei in corneocytes are observed. Conversely, when ultraviolet rays are irradiated on a skin model preliminarily cultivated with “1-piperidine propionic acid,” a significant increase of “Serpin b3” or remaining nuclei in corneocytes are not observed. Moreover, on human skin, “1-piperidine-propionic acid” suppresses the production of “Serpin b3” and results in improvement of the barrier function, moisture retention ability and skin texture and smoothness. These results have proven that application of “1-piperidine-propionic acid” leads to improve skin quality.

Based on the knowledge obtained at this time, Shiseido believes that providing completely new skin care for “fundamental improvement of skin quality” will be possible.

*1 Announced at the 24th IFSCC (The International Federation of Societies of Cosmetic Chemists) Congress in 2006 and was awarded an Honorary Mention.

Title of the research: “Identification of a Regulatory Molecule in Keratinocyte Denucleation and Its Relevance to Barrier Disruption ”

<Reference>

Outline of IFSCC

In 1959, cosmetic chemists from eight countries founded the IFSCC. The organization currently has approximately 15,000 members in 45 countries and is the world’s preeminent body in the field of cosmetic science. “IFSCC congresses” is held once every two years in even number years. Research presentations generally include nearly 200 entries, with total participants exceeding 1,600. The congresses are the world’s most prestigious forums for the presentation of cosmetic-related research.