Press Release

Shiseido Discovers the Importance of the Terminal Enzyme of Cholesterol Synthesis in Skin Turnover

~ First application of regenerative medicine mechanism into cosmetics ~

Shiseido Company, Limited (Shiseido) has been focusing on the regenerative medicine W-PRP treatment*[1], which aims to prevent skin aging, and has been conducting a joint research with physicians with the aim of applying the mechanism to the cosmetics field. This time, the team has identified that DHCR7*[2], a terminal enzyme of cholesterol synthesis plays an important role in rejuvenating skin (epidermal differentiation) and discovered an ingredient that increases the production of this enzyme. With this discovery, skincare regimen based on the same mechanism as medical cosmetics treatment will be available for home use.

*[1] W-PRP treatment: One of PRP treatments that are commonly applied as a regenerative medicine method in medical cosmetics, plastic surgery, dentistry, etc. This treatment promotes tissue regeneration by injecting the patient's own platelets and white blood cell-containing platelet-rich plasma into the patient's skin. In Japan, the treatment must be applied under the self-funded health care plan, observing the Act on the Safety of Regenerative Medicine (enforced in November 2014).

*[2] DHCR7: 7-dehydrocholesterol reductase, an enzyme responsible for the final step in cholesterol production in a body.

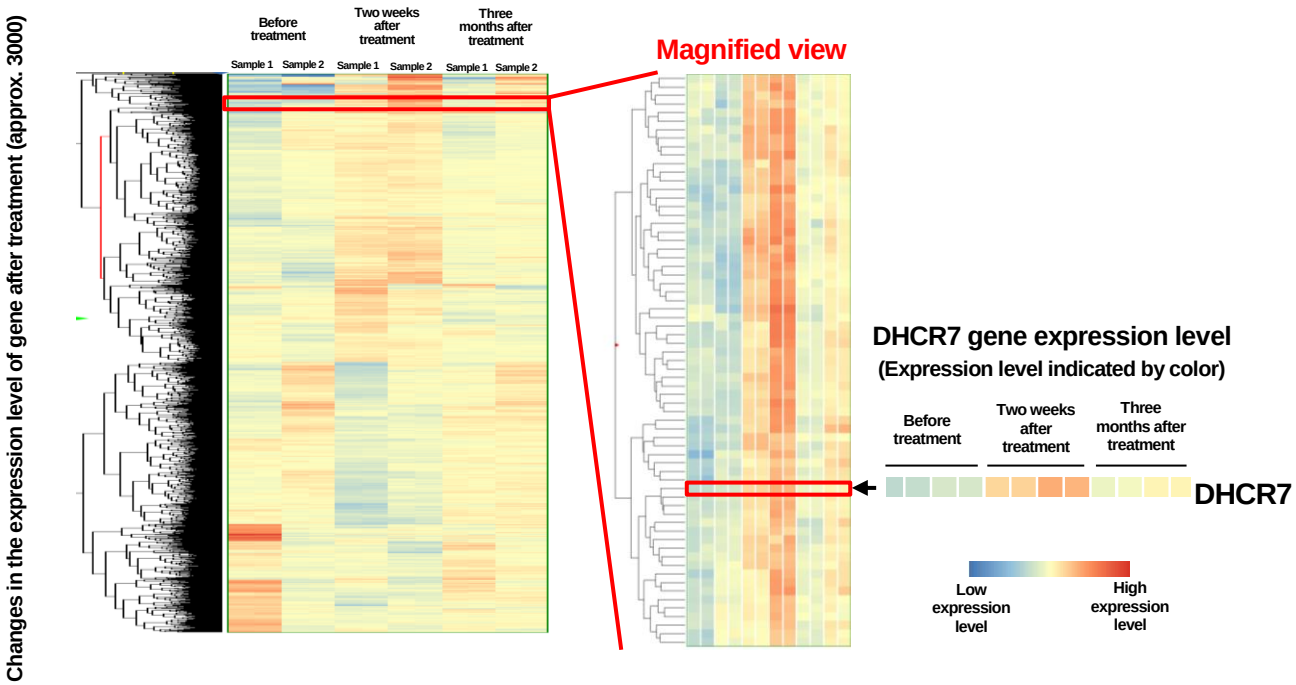
Focus on W-PRP treatment

In medical cosmetics, W-PRP treatment is said to improve skin conditions in the areas around the eyes and mouth. In 2009, Shiseido started a joint research with physicians on the effects and action mechanism of the treatment*[3] and comprehensively analyzed approximately 20,000 genes expressed in human skin cells by using DNA microarrays*[4]. As a result, the team has identified that the W-PRP treatment helps increase the expression of DHCR7 gene, a terminal enzyme of cholesterol synthesis (Picture 1) and boost the production of DHCR7 in the epidermis (Picture 2). Furthermore, the team has clarified that cholesterol synthesis is important in epidermal differentiation after observing that the differentiation is suppressed when the activity of DHCR7 is inhibited in cultured human epidermal keratinocytes (Picture 3)*[5].

*[3] Won the awards of Japanese Society of Aesthetic Dermatology for two consecutive years (2010 and 2011)

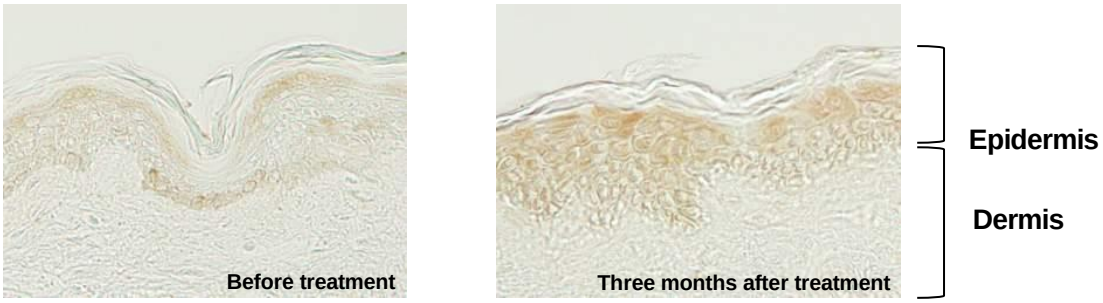
*[4] DNA microarray: A collection of microscopic DNA spots attached to a solid surface under high-stringency conditions in order to measure the expression level of genes.

*[5] Presented at the Annual Meeting of Japanese Society of Aesthetic Dermatology in 2013.



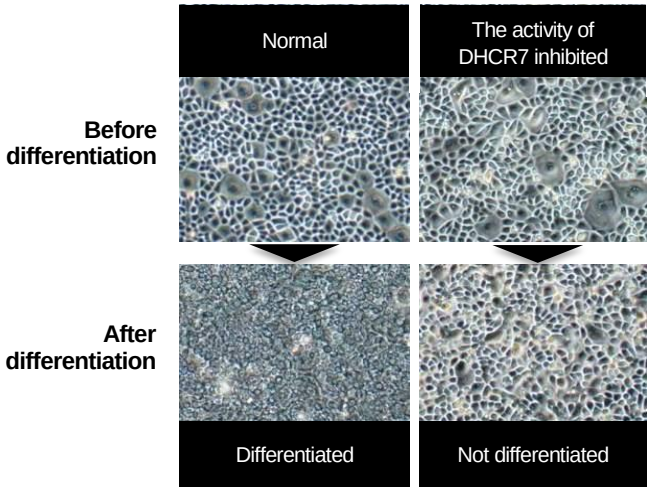
Picture 1. Increase in the expression level of DHCR7 gene after the application of W-PRP treatment.

(DNA microarray, human skin, two samples)



Picture 2. Change in the expression level of DHCR7 protein after the application of W-PRP treatment

(Human skin, enzyme dyed brown)



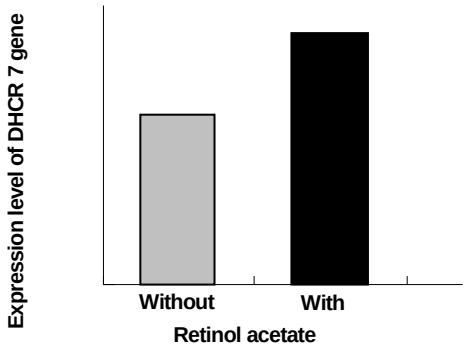
Picture 3. The activity of DHCR7 in cultured human epidermal keratinocytes.

Differentiation is not suppressed when the activity is not inhibited (left) and is suppressed when the activity is inhibited (right)

Discovery of an ingredient with the same action mechanism

The research team searched for an ingredient that would increase the expression of DHCR7 gene by using cultured human epidermal keratinocytes, and found out that retinol acetate*6 produces this effect (Picture 4). Going forward, Shiseido will apply retinol acetate to the development of new skincare cosmetics.

*6 Retinol acetate: One of vitamin A derivatives. It is also called vitamin A acetate and retinyl acetate and is used as a cosmetic ingredient in moisturizing cream and other products.



Picture 4. The effect of retinol acetate on the expression level of DHCR7 gene
(Cultured human epidermal keratinocytes)