

Press Release

Shiseido Succeeds in Visualization of Internal Skin Elasticity
- Decrease of type III collagen involved in age-dependent degradation in skin elasticity -

Shiseido Company, Limited (“Shiseido”) has developed a new method for visualization of internal skin elasticity, and revealed the involvement of type III collagen in signs of skin aging which starts from 30s.

It is known that the decrease of type I collagen, which is abundant in the dermis (decrease in overall dermal elasticity), is the main cause of age-dependent loss of skin elasticity. This time, Shiseido has newly identified that internal skin elasticity in the papillary dermis begins deteriorating in 30s, earlier than in other layers of skin, resulting in the lack of uniformity in skin elasticity. Furthermore, the team has discovered that the variation in internal skin elasticity causes morphological changes, making skin surface slightly rough, and affects how the skin looks. The involvement of type III collagen in this process is suggested from the observation that the parts with lower elasticity matched those where type III collagen decreased. At the same time, the team has found out that watercress extract* promotes the production of type III collagen.

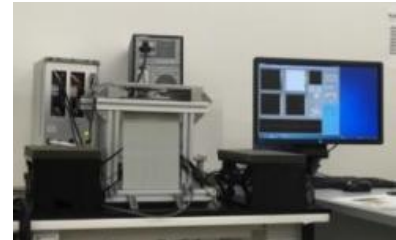
Shiseido will apply this new discovery, which is one of the results of its research on collagen, to further development of skincare products such as anti-aging products, etc.

*INCI name : NASTURTIUM OFFICINALE LEAF/STEM EXTRACT

Development of internal skin elasticity visualization technology

It is widely known that type III collagen, so-called “baby collagen,” significantly decreases with age; however, its connection with resilience had not been clarified.

Now, by using an internal skin elasticity visualization system (Picture 1), which is newly developed by applying ultrasonic technology, the research team has succeeded in visualizing the internal skin elasticity distribution for the first time in the world by analyzing the level of acoustic impedance*. In this research, the team discovered that the resilience in the papillary dermis, where type III collagen is abundant, begins deteriorating in 30s.



Picture 1. Internal skin elasticity visualization system

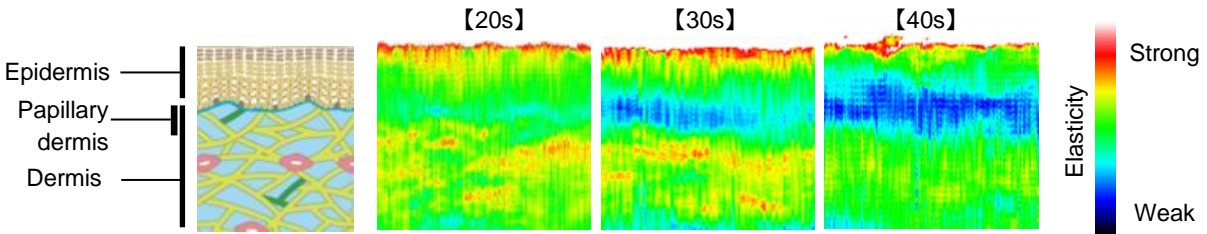
*Joint research with Honda Electronics Co., Ltd. and Toyohashi University of Technology

Aging alteration in internal skin elasticity and in skin morphological structure

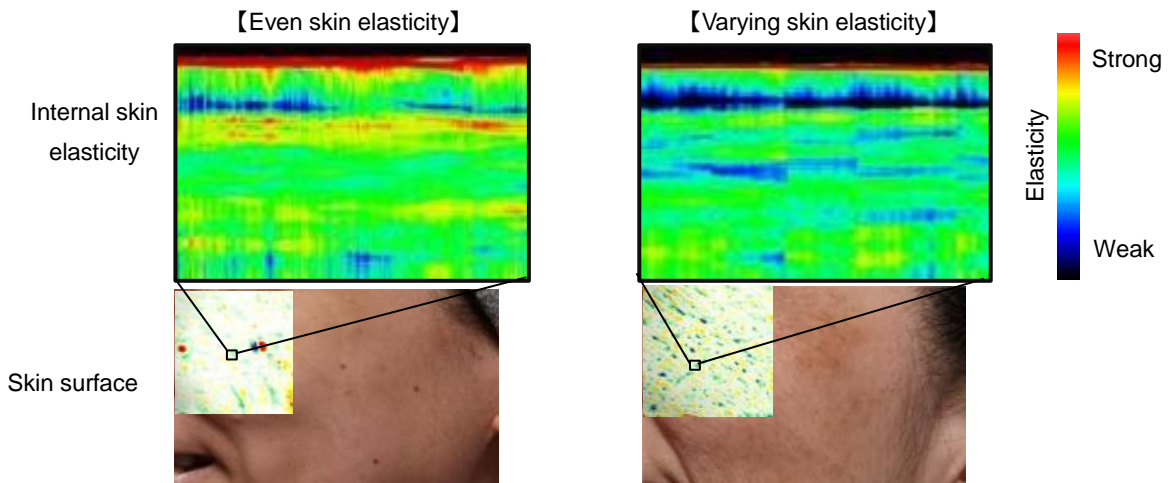
By visualizing age-dependent changes in internal skin elasticity, the research team observed that while females in 20s had relatively even skin elasticity, the elasticity in females in 30s started to decrease in the papillary dermis, and aging alteration was further developed in 40s (Picture 2). The team also studied how the variations in skin elasticity in the papillary dermis would change the look of the skin and discovered that the skin surface of females without any signs of variations in elasticity was more likely to be smooth, whereas that of females with decreased elasticity looked slightly rough (Picture 3).

Reduction in skin elasticity and type III collagen

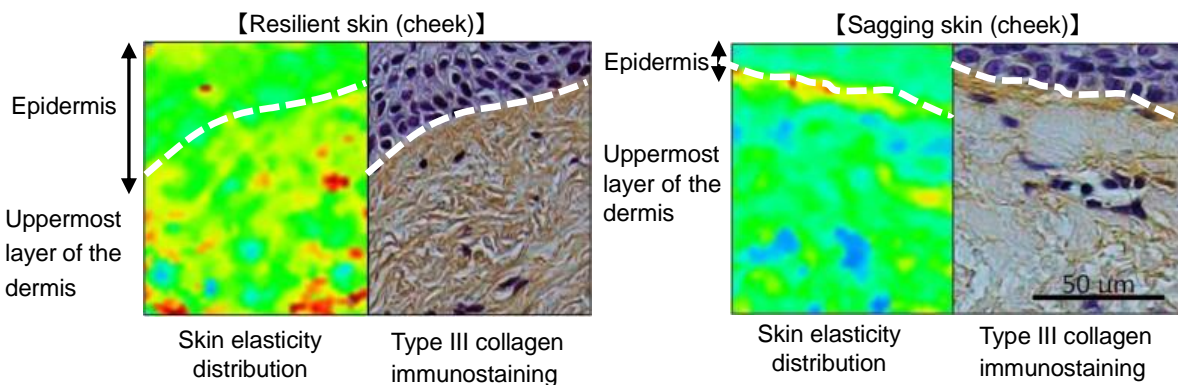
The team has found out that type III collagen is abundant in the areas with healthy skin elasticity in the uppermost layer of the dermis, but it decreases in the parts where the skin elasticity has deteriorated. This suggests that the decrease in type III collagen triggers the decrease in skin elasticity (Picture 4).



Picture 2. Change in internal skin elasticity of females in 20s-40s



Picture 3. Relationship between internal skin elasticity and skin surface



Picture 4. Comparison of internal skin elasticity and type III collagen

*The brown parts in immunostaining show distribution of type III collagen.

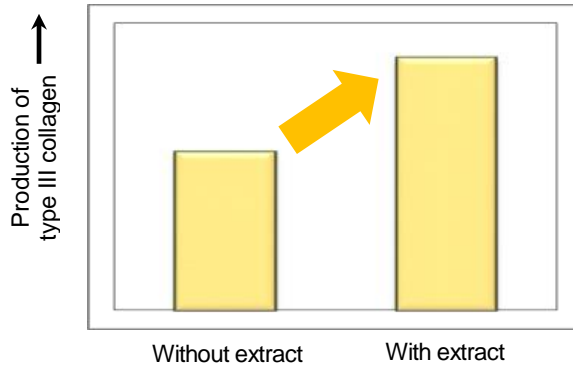
(Resilient skin demonstrates many brown parts compared to sagging skin with few brown parts.)

Watercress extract boosts production of type III collagen

Watercress (Picture 5; botanical name: *Nasturtium officinale*) is a highly nutritious vegetable rich in vitamins, particularly β carotene, and is claimed to have anticancer and arteriosclerosis prevention effects. Shiseido has discovered that watercress extract works on the dermal cells and promotes the production of type III collagen (Picture 6).



Picture 5. Watercress



Picture 6. Watercress extract boosts production of type III collagen

These research results were partly presented at the International Congress on Ultrasonics held in December 2017 in the U.S.

■ Reference: Comparison of type I and type III collagen

	Type I collagen	Type III collagen
Distribution	Almost all organs throughout the body including skin, bones, tendons and ligaments	Juvenile skin tissue, blood vessels, lungs, and internal organs
Distribution ratio/percentage	Dermis overall. Approx. 70-80% of skin collagen	Abundant in the papillary dermis. Approx. 20-30% of skin collagen
Aging alteration	Increases with growth but decreases with age	Abundant in baby skin but decreases with growth
Structure	Collagen triple-helix structure with collagen fibrils forming fibers	Collagen triple-helix structure that is thinner and shorter than that of type I collagen