

Ingestion of Collagen Peptide

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Randomized placebo-controlled double-blind trials are required in order to elucidate the effects of collagen peptide ingestion on health and beauty. In this report, two such trials performed by Nippi Inc. are summarized. Trial 1 focused on the effects of collagen peptide ingestion on skin properties, and trial 2 was performed to examine the effects on ultraviolet irradiation-induced skin damage.

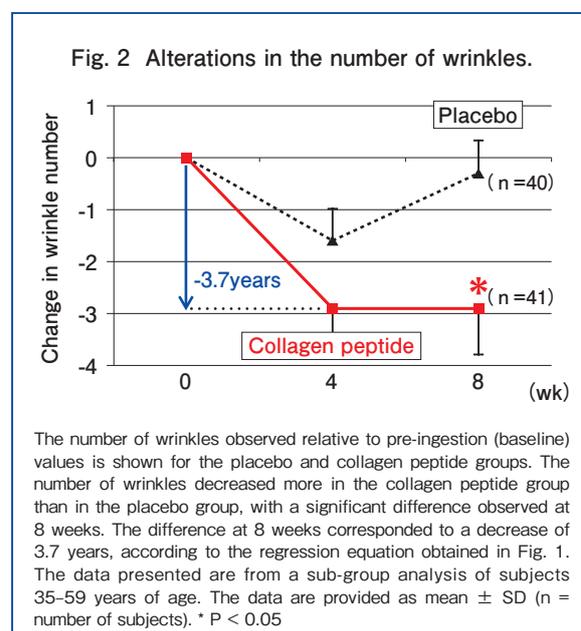
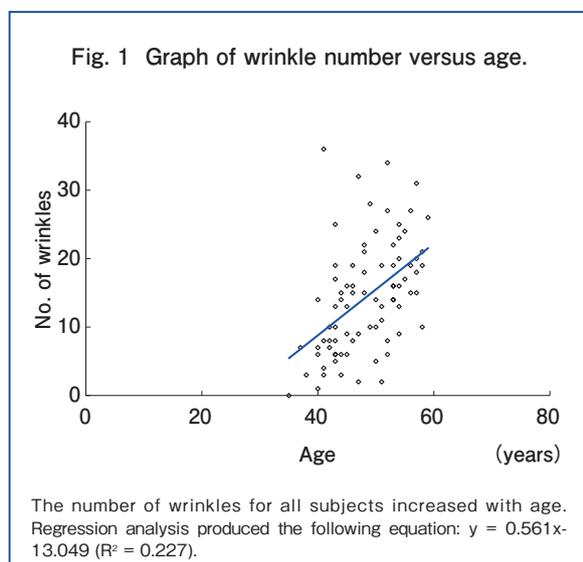
1 Beneficial effects on skin properties

Aging leads to an increased number of wrinkles and an uneven surface texture of the facial skin. In order to examine the effects of collagen peptide ingestion on facial skin, a randomized placebo-controlled double-blind trial was performed and published in 2014 ¹⁾. In this trial, healthy Japanese women aged 35–65 years ingested 5 g/day of placebo (dextrin, in water) or collagen peptide (in water) for 8 weeks after dinner. Facial skin parameters were assessed before ingestion (baseline) and after 4 and 8 weeks of ingestion. VISIA Complexion Analysis was employed to evaluate wrinkles, texture, porphyrin, pores, ultraviolet irradiation spots, surface spots, brown spots, and red areas. In the questionnaire on skin conditions, answers to the question “How do you feel about your skin condition compared to before ingestion?” were ranked “1”, “2” or “3” representing

“worse”, “no change” or “better” compared with that before ingestion, respectively. This questionnaire method was successfully employed in our previous trial on facial skin reported in 2009 ²⁾.

Fig. 1 shows the relationship between age and the number of wrinkles assessed using VISIA before ingestion (baseline) for all subjects. Linear regression analysis was used to determine that there was a positive correlation between age and wrinkles, yielding a line equation ($y = 0.561x - 13.049$) with a regression coefficient of $R^2 = 0.227$.”

In the present trial, the number of wrinkles decreased more in the collagen peptide group than in the placebo group, and the difference was statistically significant at 8 weeks for subjects less than 60 years

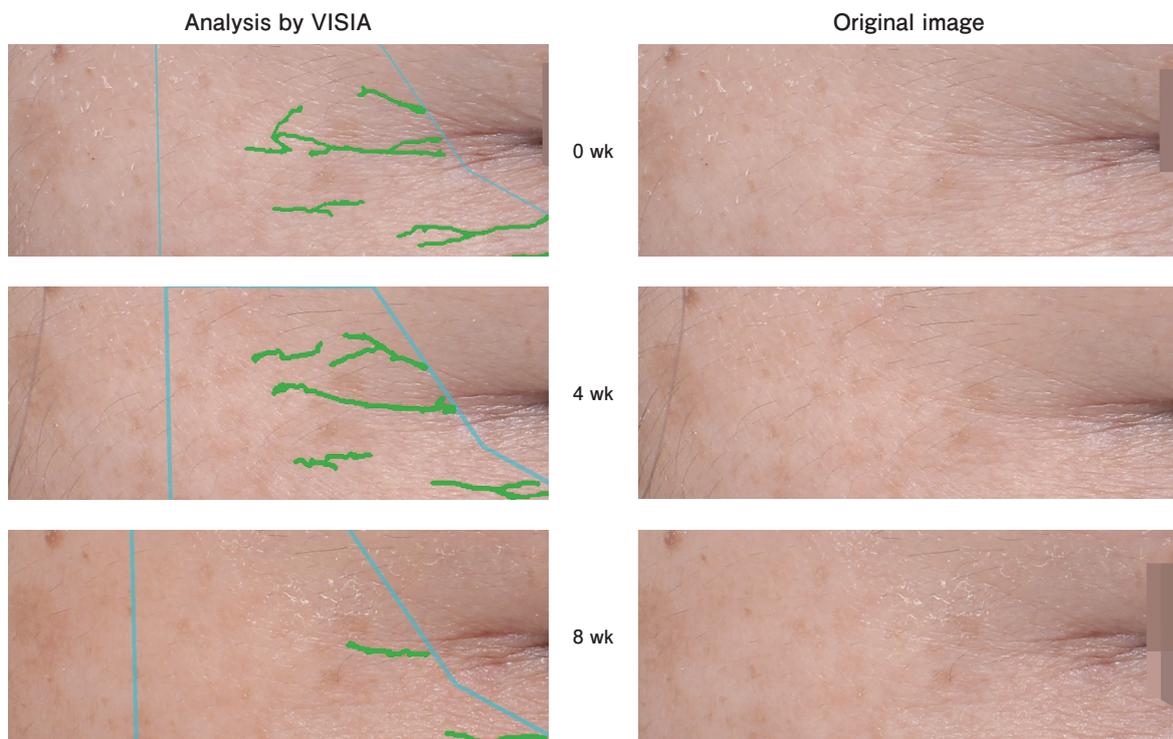


of age (Fig. 2). Fig. 3 shows a representative example of VISIA analysis of facial skin images, with the wrinkles depicted by green lines in a subject from the collagen peptide group. The decreased wrinkle number in the collagen peptide group corresponded to that of subjects 3.7 years younger (Fig. 2), according to a calculation using the equation derived from Fig. 1. For subjects with dry skin, it was revealed that facial skin texture (unevenness of skin surface) was significantly improved (Fig. 4), and the number of red

areas (representing inflammatory sites) decreased with a marginal significance in the collagen peptide group at 8 weeks (Fig. 5). The questionnaire on skin conditions indicated that the frequency of subjective self-evaluation of improved skin condition was higher in the collagen peptide group than the placebo group, with a significant difference observed at 8 weeks. Furthermore, this improvement was very evident in subjects of < 50 years of age (Fig. 6).

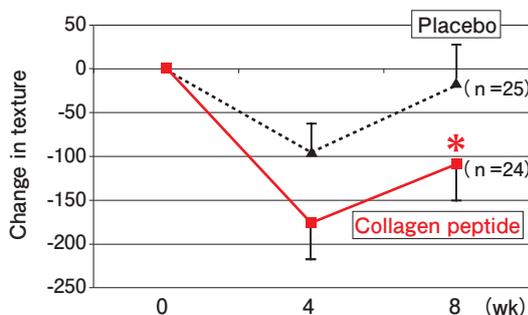
These results indicate that ingestion of collagen

Fig. 3 Representative wrinkle analysis using VISIA in a subject from the collagen peptide group.



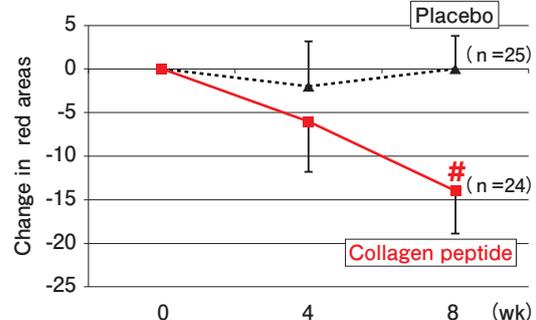
The original images (right) and the corresponding VISIA analyses (left) are displayed. Detected wrinkles are depicted with green lines in the VISIA analysis. The number of green lines decreases by ingesting collagen peptide for 4 and 8 weeks compared to pre-ingestion (baseline).

Fig. 4 Alterations in skin texture.



Skin texture (unevenness of the skin surface) observations relative to pre-ingestion (baseline) values are shown for the placebo and collagen peptide groups. Skin texture decreased more in the collagen peptide group compared to the placebo group, with a significant difference observed at 8 weeks. The data presented are from a sub-group analysis of subjects with dry skin. The data are provided as mean \pm SD (n = number of subjects). * P < 0.05

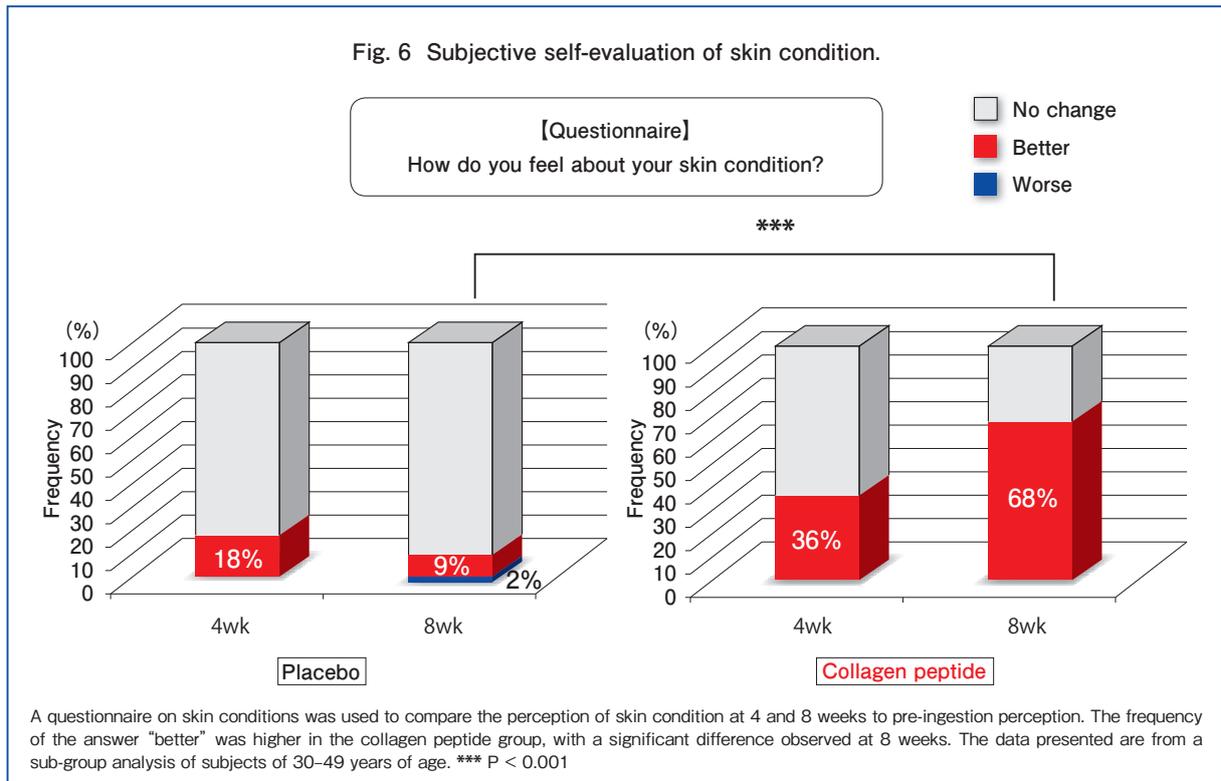
Fig. 5 Alterations in red areas.



The number of red areas observed relative to pre-ingestion (baseline) values is shown for the placebo and collagen peptide groups. The number of red areas decreased more in the collagen peptide group, with a marginally significant difference observed at 8 weeks. The data presented are from a sub-group analysis of subjects with dry skin. The data are provided as mean \pm SD (n = number of subjects). # P < 0.1

peptide improves wrinkles, texture and inflammatory reactions of the facial skin, which results in beautiful facial skin. The subjective self-evaluation of improved

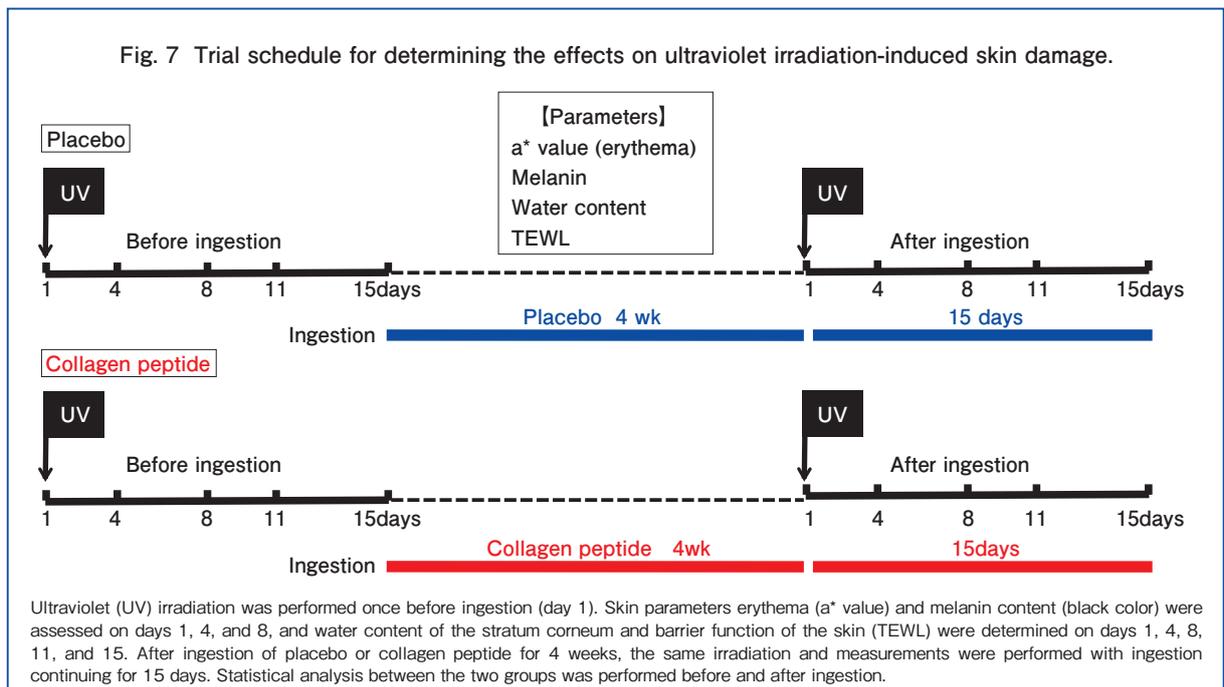
skin conditions supports the expanded marketing of collagen peptides as a food ingredient.



2 Effects of suppressing UV-induced erythema

Aging of the skin, especially the facial skin, can result from exposure to ultraviolet (UV) irradiation, which is known as "photo aging". Using an animal model of photo aging, Nippi Inc. reported that ingestion of collagen peptide suppressed skin damage

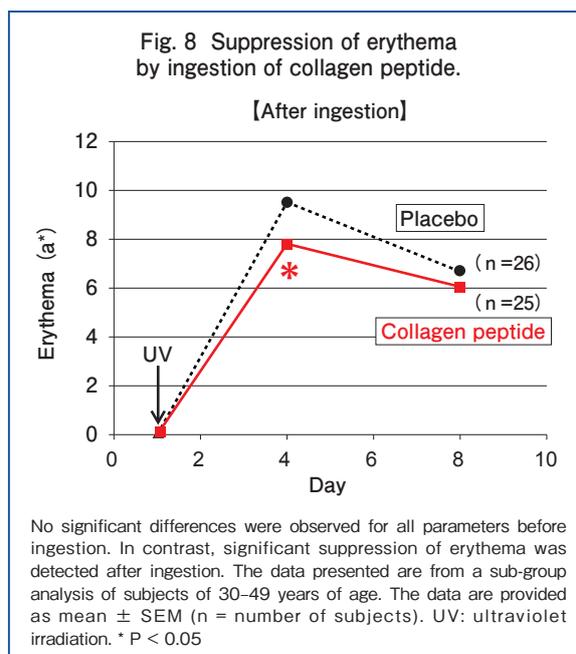
induced by UV irradiation³. In the present study, a randomized placebo-controlled double-blind trial was performed to examine whether similar suppressive effects are observed in humans⁴. In this trial, healthy Japanese males aged 20–59 years with skin types II or



III were examined. Type II and III skin are those which “burn easily and tan poorly” and “tans after initial burn”, respectively ⁵⁾. In the animal study mentioned above, the animals were repeatedly irradiated with UV radiation. However, a single dose UV irradiation was employed in the present trial because repeated irradiation resulted in the development of a marked black coloration at the site.

In this trial, a single dose of UV irradiation was administered to the skin of back before ingestion. The skin was then assessed for the presence of erythema (a* value) and melanin content (black color) on days 1, 4 and 8, and water content of the stratum corneum and barrier function of the skin (TEWL) on days 1, 4, 8,11, and 15. Subsequently, placebo or collagen peptide was ingested for 4 weeks, and UV irradiation was performed at a different site on the skin. Ingestion of placebo or collagen peptide was continued for an additional 15 days, and measurements were performed as before ingestion (Fig. 7).

Before ingestion, no significant differences were observed for all parameters. In contrast, for subjects of 30–59 years of age, erythema was suppressed by 4 weeks of collagen peptide ingestion (Fig. 8). Erythema is an inflammatory reaction accompanying enhanced blood flow. The present trial suggests that collagen peptide ingestion suppresses inflammatory reactions induced by UV irradiation. Thus, photo



aging in humans may be suppressed by collagen peptide ingestion.

As shown here, the two trials performed by Nippi Inc. clearly demonstrate the beneficial effects of collagen peptide ingestion on the skin. Nippi Inc. will continue scientific studies on the contribution of collagen peptide to the health and beauty of humans.

References

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