

Effect of Coenzyme Q₁₀ as a Supplement on Wrinkle Reduction

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Introduction

Coenzyme Q₁₀, which is originally produced by humans themselves, is involved in energy production in mitochondria which is necessary for humans to live. It is a vitamin-like substance with a strong antioxidative effect. Recently, it has attracted attention from the standpoint of anti-aging, because it is present in almost all organs and because it decreases with age.¹⁾

In Japan, coenzyme Q₁₀ has been used as a prescription drug (metabolic cardiogenic) in the treatment of “mild to moderate symptoms of congestive heart failure during basic treatment”²⁾ and also as an over-the-counter (OTC) drug (energy metabolism-improving drug for circulatory organs) in the treatment of “palpitations, shortness of breath, and edema which occur due to mild heart disease when the level of physical activity becomes slightly higher than usual.”³⁾ On the other hand, in Europe and the U.S.A., coenzyme Q₁₀ has long been used widely as a supplement by athletes performing hard exercise and even by the general public, and it has been confirmed that this substance has a suitable margin of safety. Under such circumstances, in Japan it has also become possible to ingest coenzyme Q₁₀ as food since 2001, and its usefulness as a new supplement has been recognized gradually.⁴⁾

As a supplement, coenzyme Q₁₀ is usually used to inhibit various undesirable phenomena for the body due to stress of oxidation, to promote

energy production, and to supplement its decrease with age.⁴⁾ On the other hand, coenzyme Q₁₀ has also been used topically as a cosmetic in Europe and the U.S.A., and improvement of wrinkles by 6-month continuous, topical application of 0.3% coenzyme Q₁₀ has been reported.¹⁾

Therefore, focusing attention on wrinkles due to aging, we investigated the antiwrinkle effect of coenzyme Q₁₀ and found the possibility of wrinkles being improved by intake of this substance.

1. Antiwrinkle Effect of Coenzyme Q₁₀

For quantitative evaluation of wrinkles, silicone rubber was applied to skin to make a replica of the skin. Then three-dimensional analysis of wrinkles on the replica was performed by the laser cutting method to calculate the % wrinkle area (percentage of wrinkles to the target area: 10x10 mm²) and wrinkle volume (total volume of wrinkles in the target area).⁵⁾

Q10AA® (containing 60 mg/day of coenzyme Q₁₀, Shiseido Pharmaceutical Co., Ltd.) was given every day to 8 female volunteers (mean age: 43±3years) with a % wrinkle area 10%, and moreover a wrinkle volume 0.5 mm³. The % wrinkle area and wrinkle volume were measured at various times after starting intake. After 2 weeks of intake, the % wrinkle area significantly decreased (33%, Figure 1) relative to its value before intake, and so did the wrinkle volume (38%, Figure 2). Even after 3 months of intake, its effects on these parameters were maintained. After 2 weeks of intake, the maximum depth of the maximum wrinkle and the mean depth of all wrinkles decreased significantly by 16% and 7%, respectively.

Figure 3 shows the results of image analysis in a 43-year-old woman. The green portions represent wrinkles. As a result of quantitative analysis by this method, it was found that the % wrinkle area and wrinkle volume, which were 24.2% and 1.53 mm³, respectively before starting intake with Q10AA®, markedly improved to 16.1% and 0.89 mm³,

respectively after 2 weeks of intake (Figure 3b) and to 14.4% and 0.81 mm³, respectively after 3 months of intake.

Since coenzyme Q₁₀ improves wrinkles mainly by its antioxidative and cell-activating effects, its mechanism of action is considered possibly different from that of retinol for topical application. In the present study, oral coenzyme Q₁₀ exhibited an antiwrinkle effect rapidly compared with its preparation for topical application.¹⁾ This result suggests that after intake, distribution of coenzyme Q₁₀ in the dermis was more favorable, and skin function was activated more rapidly via the systemic effects, such as improvement of systemic peripheral circulation.

Conclusion

This report describes the antiwrinkle effect of coenzyme Q₁₀. However, we have already found that this substance also exhibits other beneficial effects on skin. We will investigate and clarify each effect and its mechanism in detail in the future.

References

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Figure 1

Time course of % wrinkle area after starting intake with Q10AA®
(containing 60 mg/day of coenzyme Q₁₀)

Wrinkle area (%)

Before intake 2 weeks 1 month 2 months 3 months

Mean±standard deviation, n = 8 (female, mean age: 43 ± 3 years)

Wilcoxon-Dunnett's test, * p<0.05

Figure 2

Time course of wrinkle volume after starting intake with Q10AA®
(containing 60 mg/day of coenzyme Q₁₀)

Wrinkle volume (mm³)

Figure 3

Change in the replica of wrinkles revealed by image analysis after starting intake with Q10AA® (containing 60 mg/day of coenzyme Q₁₀ (43-year-old female)

(a) Before intake

(b) After 2 weeks of intake

(c) After 3 months of intake