

ORAL ADMINISTRATION OF CHICKEN GELATIN PEPTIDE IMPROVES MOISTURE RETENTION OF SKIN

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BACKGROUNDS AND OBJECTIVE:

Collagen and gelatin are prepared from animal skins and bones, usually of bovine and porcine, and widely used in technological, medical, cosmetic and food industries.

In spite of long-term experience of use of gelatin as a food ingredient, physiological functions of gelatin have not been studied well^{1,2}. Particularly, the physiological functions of gelatin from different animal sources have rarely been compared. Our recent studies suggested that chicken gelatin exhibited characteristic functions: e.g., allergenic property of chicken gelatin was much less than that of bovine gelatin.

The present study was designed to examine the effects of orally given chicken gelatin on healing dermal wounds in rats and moisture retention by human skin.

MATERIALS AND METHODS:

Preparation of chicken gelatin peptide (CGP): CGP was conventionally prepared by extracting gelatin from chicken skins and bones, digesting gelatin with papain, and adjusting the content to 25% (w/w).

Healing epidermal/dermal wounds in rats by oral administration of CGP: Twenty-four male Wistar rats (9 weeks old) were divided into two groups. To the rats of control and test groups, 4-ml portions of water or CGP, respectively, were orally given daily during the entire test period of 11 days. Commercial feed and tap water were given *ad libitum* to the rats. On the 3rd day of the test period, dermis and epidermides of rat skin (2 x 2 cm² in area) were cut off. On the 7th and 11th days of the test period, granulated tissues were collected and subjected to determination of weight, moisture content and hydroxyproline content³.

Moisture retention in human skin: Ninety-seven female volunteers (10-40 years old) with healthy normal skin were divided into three groups: to groups II (the test group, n=36), III (the placebo group, n=28) and I (the control group, n=33), test soup containing CGP of 1,000 mg/serving, placebo soup and no soup were daily given for two months respectively. These tests were carried out from September to November, 1998.

Skin-moisture contents of the volunteers were determined conductance-wise with a Skicon-200 skin surface hygrometer (IBS Co., Hamamatsu, Japan)⁴ every two weeks and in the 3rd week after the test period. Data were expressed in indexes compared to the initial value set as 100.

RESULTS AND DISCUSSION:

Acceleration of dermal wound healing in rats by oral administration of CGP: The dermal wound healing was significantly accelerated in CGP-administered rats in terms of weight gains, moisture contents and hydroxyproline contents of the granulated tissues. As shown in Fig. 1, hydroxyproline contents of the granulated tissues of the CGP-administered rats were higher than those of control rats, suggesting acceleration of collagen biosynthesis, since hydroxyproline is an amino acid characteristic to the collagen molecule.

Improved moisture retention by human skin by oral administration of CGP: It is well known that the moisture contents of the skin depend on the climatic environment and decrease more quickly in dry seasons than wet seasons⁵. Generally speaking, it gets drier and drier day by day from late fall to early winter in Japan. The present study was carried out in such a season.

As shown in Fig. 2, moisture-retention indexes of groups I (the control group) and III (the placebo group) decreased with time of the test period. No significant difference was observed between groups I and III except for the 2nd week's values; the 2nd week's value of group III may have reflected the placebo effect.

As for group II, no change in moisture-retention indexes was observed during the test period. Moreover, the moisture-retention indexes were higher than those of groups I and III. However, the moisture-retention index decreased in three weeks after the test period as did the other groups.

CONCLUSION:

We observed the following: (1) oral administration of chicken gelatin peptide (CGP) accelerated epidermal/dermal wound healing in rats due to increased collagen biosynthesis, and (2) oral administration of CGP (1,000 mg/day)-containing soup improved moisture retention by human skin even during the dry season.

Further studies are in progress to find why oral administration can improve moisture retention of human skin, whether or not oral administration of CGP can improve dry skin, and so forth.

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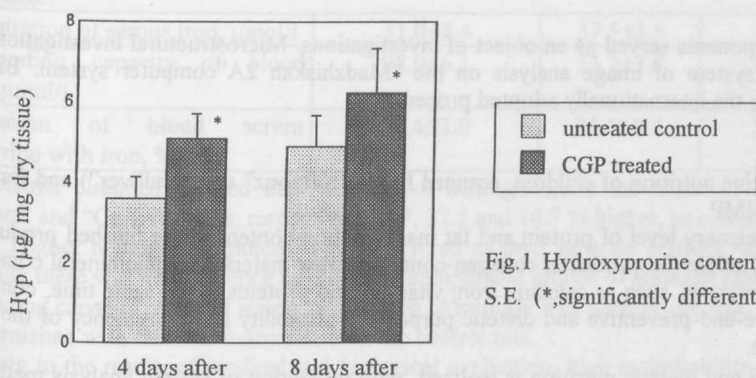


Fig. 1 Hydroxyproprine content of granuled tissue of rats. Values present the mean ± S.E. (*, significantly different between control and CGP-treated rats at $p < 0.05$)

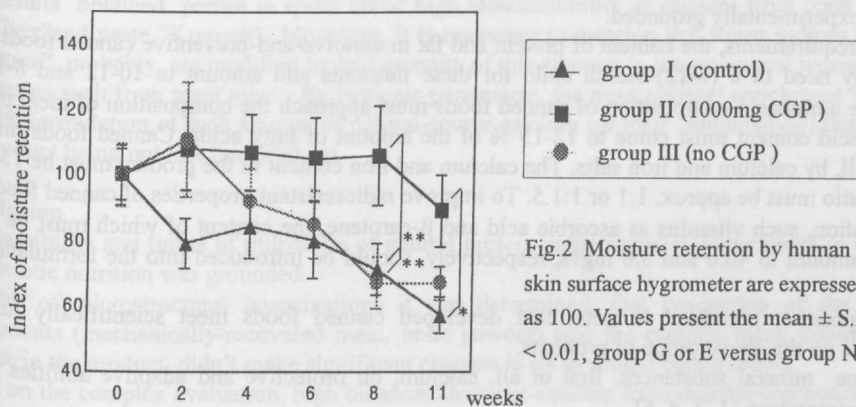


Fig.2 Moisture retention by human skin. Data obtained by determination with a skin surface hygrometer are expressed in indexes compared to the initial value set as 100. Values present the mean ± S.E. (* $p < 0.05$, group G versus group N ** $p < 0.01$, group G or E versus group N)