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Resview Article

Liposomes Containing Nutritional Tripeptides can Improve Well-Being, Hair Growth and Skin Radiance – a Summary of the Literature and Findings from a Large Cohort Customer Survey

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ABSTRACT

Objective: The addition of tripeptide collagen (TC) supplements to otherwise healthy diets are claimed to exert benefit in some individuals. Liposomes may aid in protecting TC during early gut transit, improving small gut absorption and thus bioavailability. The aim of this paper is to investigate and summarise the existing literature on tripeptide collagen (TC) supplementation and evaluate reported outcomes from a consumer cohort using liposomal tripeptide collagen (LTC), specifically fish-derived Glycine-Prolene-Hydroxyproline (Gly-Pro-Hyp).

Materials and Methods: A literature review of TC supplementation was conducted. Additionally, an electronic questionnaire was independently formulated and distributed to 300 consenting adults who had been using LTC for at least one month. A total of 272 responses were received; 179 met inclusion criteria.

Results: Survey data shows reported improvement in well-being (78%), better skin quality (83%), reduction in skin disorders (58%), improved hair growth (70%), and reduction in joint pain (39%). Evidential support for nutritional tripeptides in the maintenance of well-being was corroborated in existing literature.

Conclusions: Existing literature suggests potential benefits of TC supplementation and qualitative findings in this work suggest that liposomal TC may offer enhanced improvements. Liposomal delivery may increase bioavailability, though further controlled studies are required.

Keywords

Tripeptide collagen, Liposomes, Skin ageing, Joint pain, Nutritional supplementation, Skin health, Skin disorders, Acne, Dermatitis, Psoriasis, Hair growth.

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Introduction

Collagen is the principal structural protein in the human body, providing strength and integrity to skin, bone, ligaments, and tendons [1]. More than 80 types of collagen have been identified, each synthesised from distinct amino acid sequences that determine specific biological roles [2,3]. Collagen production declines with age [4,5], contributing to visible and functional degenerative changes such as reduced skin elasticity, impaired

wound healing, and deterioration in musculoskeletal tissues [6]. To counter these changes, various collagen formulations derived from animal and marine sources have been developed for oral and topical use. Reported efficacy ranges from anecdotal reports to controlled double-blind clinical studies [7-13], which has led to ongoing scepticism [14].

Recent attention has focused on low-molecular-weight collagen-derived peptides, particularly di- and tripeptides such as Gly–Pro–Hyp from fish sources (usually unused parts of edible fish such as Japanese Sea Bream). Such peptides have been used in health and well-being for many years; evidence suggests that they may improve skin elasticity and hydration, reduce visible signs of ageing, and support joint function and general well-being [7,8,10,15-18]. Their proposed mechanism involves stimulating fibroblast and mesenchymal cell activity, enhancing collagen, hyaluronic acid, and proteoglycan synthesis [19,20]. This can improve tissue hydration, structural integrity, and cartilage regeneration, with associated reductions in joint discomfort [10,21,22]. A recent double-blind study by Bolke et al. demonstrated improvements in skin hydration, elasticity, and dermal structure following oral collagen supplementation [13].

Conventional collagen is largely degraded by gastrointestinal proteases before absorption, limiting systemic availability; liposomal delivery systems offer a strategy to protect these peptides and enhance absorption. Liposomes consist of a phospholipid bilayer surrounding an aqueous core, which can encapsulate water-soluble compounds such as collagen tripeptides. In vitro studies suggest that liposomes of 150–200 nm can survive gastrointestinal conditions and facilitate uptake through lacteals via chylomicron and microfold pathways. Entering systemic circulation through the mesenteric lymphatics bypasses hepatic first-pass metabolism. This pathway is already used in pharmaceutical liposomal formulations to improve the bioavailability of drugs otherwise metabolised by the liver [24-28].

Collagen synthesis is influenced by environmental, nutritional, hormonal, genetic, and epigenetic factors, with nitric oxide serving as a key signalling molecule. Age-related declines in nitric oxide may contribute to reduced collagen production [29]. At the molecular level, collagen formation can involve the assembly of glycine, proline, and hydroxyproline residues into a stable triple-helix structure. Glycine allows tight helix packing, proline supports structural stability and cellular metabolism [12,30], and hydroxyproline maintains connective tissue integrity [1,31]. Ingested tripeptides have been detected in venous circulation within 30 minutes, supporting the hypothesis of lymphatic absorption that bypasses the liver [32].

A novel liposomal tripeptide collagen (LTC), SAIFColl3 (Elle Sera™ UK), has recently entered the nutrition and aesthetic market. This formulation combines fish-derived tripeptides with liposomal encapsulation and antioxidant components to improve stability and bioavailability [33]. The present study reports findings from a client-response questionnaire investigating potential benefits of LTC supplementation, including effects on skin, joint function, and overall well-being.

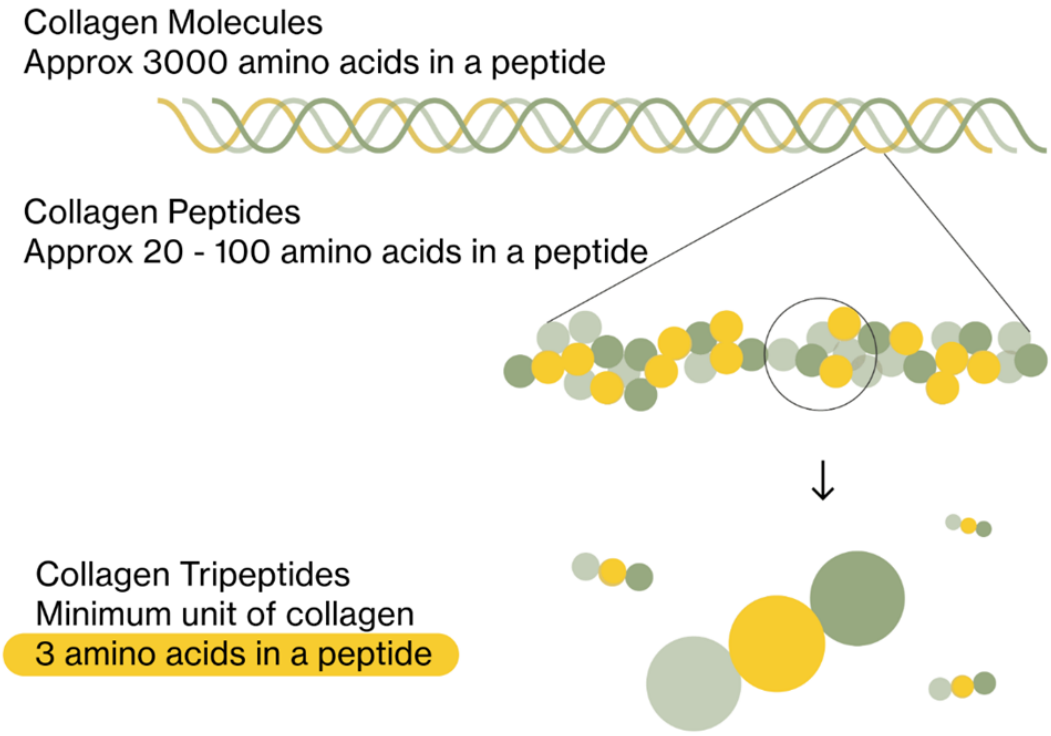

Figure 1: Shows the construction of a stable trihelix collagen from the bonding of small tripeptide sequences into longer chains. The order of the sequencing dictates the type of collagen being constructed.

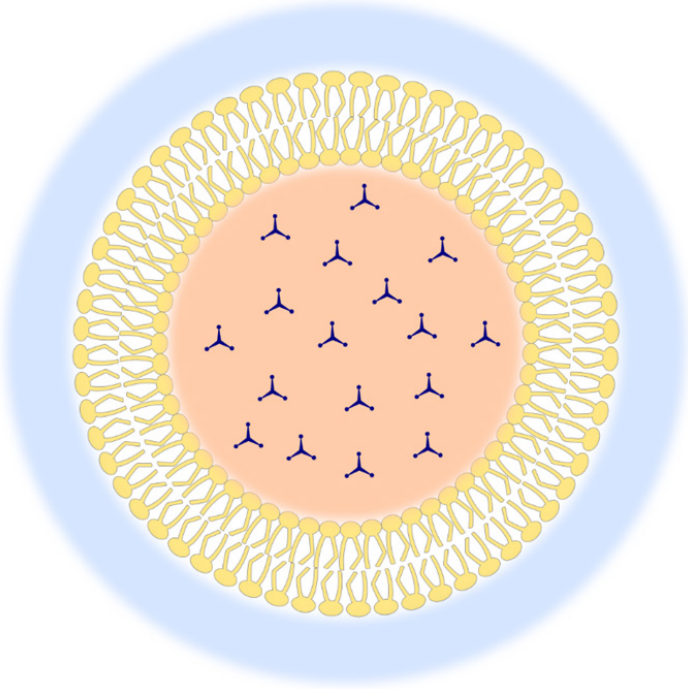

Figure 2: Structure of a typical liposome containing tripeptide sequences.

Materials and Methods

A customer survey administered via Typeform (https://www.typeform.com) was used to collect data from adults taking oral liposomal tripeptide collagen (LTC) product for at least one month. The specific product was manufactured by GMPriority Pharma using SAIFColl[3*] and distributed by Elle-Sera™ (UK). The survey was generated independently by the authors and sent by Elle-Sera™ to a group of their existing customers.

A total of 300 consenting adults were invited to participate. Of these, 272 responses were received (response rate 90.7%). Ninety-three responses were excluded due to incomplete data or duration of use less than one month. A total of 179 responses (65.8%) were included in the final analysis.

Results

Metric	Count	% of respondents
Total completed responses	181	100%
Female respondents	173 / 181	96%
Taken LTC daily for 1+ month	179 / 181	99%
Have coexisting medical conditions	22 / 121	18%
Report improved skin quality / radiance	141 / 169	83%
Report improved hair quality	113 / 154	73%
Report improved hair growth rate	107 / 157	68%

Table 1: Key headline responses.

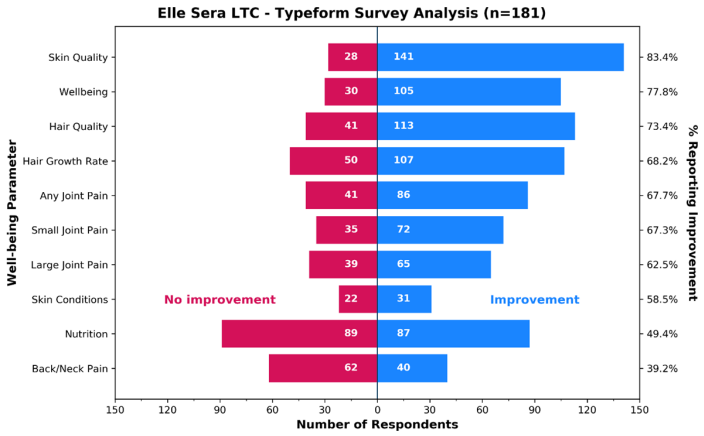

Figure 3: Graph showing number and percentage improvement in well-being parameters related to the ingestion of liposomal tripeptide collagen for at least one month.

The graphical analysis demonstrated improvement across multiple well-being parameters following ingestion of liposomal tripeptide collagen (LTC) for at least one month. The greatest reported benefit was in skin quality, with 83% of respondents indicating improvement. Hair quality and growth improved in approximately 70% of respondents. Improvements in joint pain and stiffness were also reported, with up to 67% noting benefit in small joints. Among respondents with pre-existing episodic skin conditions, including eczema and psoriasis (n = 53), approximately 60% reported improvement.

Approximately 50% of respondents taking LTC primarily for general nutritional benefit reported improvement in well-being. Among those with pre-existing neck and back pain, 40% reported improvement.

Additional qualitative findings

Analysis of open-text responses identified additional perceived benefits:

- Nail strength and growth: 42 respondents (23%)
- Brighter eyes / whiter sclera: 11 respondents (6%)
- Improvement in irritable bowel symptoms: 2 respondents
- Reduced small joint pain, particularly in cold environments

Discussion

Collagen supplementation is widely used, with evidence from animal and human studies supporting roles in anti-ageing and tissue regeneration. Improved hair growth and reduction in joint pain have both been previously reported for individuals taking oral tripeptides and this survey supports their findings, but using a more targeted approach with a liposomal delivery formulation containing powerful antioxidants is an attractive option. Recent work by Boudko and Adnan et al., suggests that tripeptide sequences such as Gly-Pro-Hyp may support tissue repair through several mechanisms, including: -

- Signal fibroblasts to produce more collagen and other extracellular matrix proteins, which are essential for repairing

and remodelling tissues.

- Enhance cell signalling and migration. They can interact with cell surface receptors, like integrins, to influence cellular migration, differentiation and proliferation, which is crucial for rebuilding damaged tissue.
- Improve stem cell behaviour.
- Modulate the mechanical properties of mesenchymal stem cells to promote their proliferation and wound healing capabilities.
- Stimulate stem cell replication, improving wound repair.
- Promote wound healing by increasing the accumulation of total proteins, glycosaminoglycans and DNA in dermal wounds, and stimulating the formation of new blood vessels (angiogenesis) in the damaged area.
- Provide antioxidant and anti-inflammatory effects, especially if taken alongside other antioxidants.
- Act as signalling molecules to trigger the secretion of other important hormones such as thyrotropin-releasing hormone.

In this cohort, high proportions of respondents reported improvements in skin quality (83%), joint pain relief (up to 67%), hair quality (73%), and overall well-being (78%) following at least one month of LTC use. The improvement found by those with pre-existing neck and back pain is particularly significant because this type of pain is difficult to treat even pharmacologically. Surprisingly only about 50% of respondents taking LTC for nutritional benefit reported improvement. Many participants were within the perimenopausal age range, a group commonly seeking interventions for skin, hair, and musculoskeletal symptoms. These findings are consistent with existing evidence that tripeptides support the regeneration of cartilage in vitro, suggesting a potential role in degenerative joint pain reduction [21,22]. The liposomal formulation may enhance delivery and bioavailability of specific tripeptide sequences, although this remains to be confirmed in controlled studies.

The high response rate (90.7%) suggests strong engagement and minimal non-response bias; however, the study design is observational and subject to bias. The absence of blinding, control group, and objective outcome measures limits the strength of conclusions. Findings should therefore be interpreted cautiously.

Conclusion

This study supports existing literature suggesting that tripeptide collagen supplementation may contribute to improvements in skin and hair quality, joint function, and general well-being. There is an argument that LTC should be more widely considered as a supplement for general health in the ageing population. Potential applications may extend to populations with increased physiological demand, including individuals with trauma, burns, or chronic inflammatory conditions, although further research is required.

Liposomal delivery systems may enhance bioavailability and represent a promising approach for targeted nutritional supplementation. However, given the observational nature of this study, further randomised controlled trials are required to confirm efficacy and establish clinical relevance.

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