

# An Overview on Collagen

## What is collagen?

Collagen is the most abundant structural protein found in the human body and it supports our cells, bones and connective tissues.<sup>1</sup>

There are 28 forms of collagen that have been discovered, but Type I and Type III are the most abundant in the body.<sup>2,3</sup> These two types are the main components of the interstitial matrix,<sup>1</sup> a complex structure of the cells found in the connective tissues that make up and support our bones, ligaments, tendons, nerves, blood vessels, and skin.<sup>1,4</sup>

Collagen plays a vital role in many functions in the body, including:\*

- Supports new tissue formation and maintenance<sup>5</sup>
- Support for skin, hair, nails, bones & joints<sup>6,7,8,9,10,11,12</sup>
- Supports cellular function<sup>6</sup>

## Why is collagen supplementation beneficial?

Our bodies make collagen on their own throughout our lives, but our ability to produce this particular protein diminishes over the lifespan, starting in our 20s. By age 45, our collagen production is reduced by as much as 25%, and by age 60 this may be closer to 50%.<sup>7</sup>

This reduction in our natural production of collagen over time can reduce our skin's firmness and elasticity,<sup>7,8</sup> make our bones, tendons & ligaments weaker<sup>12,13</sup> and decrease mobility in our joints. These functional declines have implications in our bodies' skin, hair, nail and joint health.

Additional risk factors that accelerate the downturn in our natural collagen production include excessive alcohol use, smoking, overexposure to the sun,<sup>14</sup> and a diet high in ultra-processed foods with added sugars.<sup>15</sup>

Some good news: we can obtain collagen through our food intake. Dietary sources of collagen include fish and animal meats on the bone including cartilage and skin, and bone broth. However, many individuals may not consume these foods regularly, so adding a collagen supplement to our daily regimen may help us continue to reap the benefits of collagen as we age.

## Is collagen a complete protein?

Collagen protein lacks one essential amino acid (tryptophan) and is therefore categorized as an incomplete protein source. However, compared to other proteins, collagen has a unique amino acid composition given its high content of glycine, proline and modified amino acid hydroxyproline.<sup>16</sup>

\*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

## **Why is hydrolyzed collagen important?**

Dietary collagen is difficult to digest and not easily absorbed. Hydrolyzing collagen involves breaking up the difficult to digest proteins into easily digested peptides, or chains of beneficial amino acids which is why you often see the terms hydrolyzed collagen and collagen peptides used interchangeably. This method ensures far greater absorption and bioavailability.

## **Where does the collagen in Orgain's products come from?**

All of the collagen peptides in Orgain's products are derived from grass-fed, pasture-raised cattle. The collagen types included in our formulations are Type I & Type III. These types lend all the great benefits of collagen to your skin, hair, nails, and joints.\*

## **Is there a vegan alternative for collagen peptides from animal sources?**

At this time, the only natural sources of collagen are derived from animal and marine sources. However, several other nutrients are important for the natural production of collagen in the body. The most significant of these is vitamin C, which is a necessary cofactor in collagen synthesis. It also functions as an antioxidant to combat oxidative stresses that could otherwise degrade existing collagen. Other relevant nutrients include copper, zinc and sulfur which are additional cofactors in collagen production.<sup>17</sup>

## **What are the potential benefits of collagen peptides?**

Adding a collagen peptide supplement to your routine may offer the following benefits:\*

- Enhances skin elasticity<sup>7,8 †</sup>
- Promotes skin firmness<sup>7,8 †</sup>
- Boosts skin hydration<sup>8 †</sup>
- Strengthens hair & nail health<sup>9</sup>
- Supports strong bones & mobile joints<sup>10,11</sup>
- Supports athletic recovery<sup>11,18,19</sup>

## **What are the recommendations for use?**

Research suggests that a beneficial dose for collagen peptides supplementation may range from 2.5-20 grams per day.<sup>16,20</sup> This can typically be achieved with one serving of an [Orgain Collagen Peptides](#) product. The benefits of collagen peptides for healthier skin, hair and nails may be apparent within 4-12 weeks<sup>21</sup> with routine supplementation. The benefits of collagen peptides for bone, joint health and athletic recovery with routine supplementation may be apparent over 3-6 months.<sup>10,11,18,19</sup>

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†95% of participants in these studies were female.

## ***What are the attributes of Orgain Collagen Peptide Products?***

Orgain's collagen peptide containing products are all subject to the same rigorous approvals, formulation standards and Good Manufacturing Practices (GMP) as other trusted Orgain products.

- Flavorless & odorless
- Soluble & easily dissolved
- Easy to mix in hot or cold liquids
- Grass-fed & pasture-raised, bovine derived collagen

And as with all our products - everything we make is crafted from high-quality ingredients.

- Made with Non-GMO ingredients
- Made without gluten & soy
- Made without dairy
- Made without artificial colors, flavors, sweeteners & preservatives

## ***Are there any precautions/contraindications?***

If you are pregnant, nursing or have a medical condition, please consult with your treating healthcare provider before use.

## ***Still have questions?***

Consumers reach out to us at [info@orgain.com](mailto:info@orgain.com) and healthcare professionals please reach out to us at [medinfo@orgain.com](mailto:medinfo@orgain.com) and one of our registered dietitians on staff would be happy to address your inquiries.

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# References

- <sup>1</sup> Nezwek TA, Varacallo M. Physiology, Connective Tissue. Nih.gov. Published October 30, 2019. <https://www.ncbi.nlm.nih.gov/books/NBK542226/>
- <sup>2</sup> Naomi R, Ridzuan PM, Bahari H. Current Insights into Collagen Type I. *Polymers*. 2021;13(16). doi:10.3390/polym13162642
- <sup>3</sup> Kuivaniemi H, Tromp G. Type III collagen (COL3A1): Gene and protein structure, tissue distribution, and associated diseases. *Gene*. 2019;707:151-171. doi:10.1016/j.gene.2019.05.003
- <sup>4</sup> Kannus P. Structure of the tendon connective tissue. *Scand J Med Sci Sports*. 2000;10(6):312-320. doi:10.1034/j.1600-0838.2000.010006312
- <sup>5</sup> Zhao C, Xiao Y, Ling S, Pei Y, Ren J. Structure of Collagen. *Methods Mol Biol*. 2021;2347:17-25. doi:10.1007/978-1-0716-1574-4\_2
- <sup>6</sup> Wu M, Crane JS. Biochemistry, Collagen Synthesis. Nih.gov. Published April 21, 2019. <https://www.ncbi.nlm.nih.gov/books/NBK507709/>
- <sup>7</sup> Aguirre-Cruz G, León-López A, Cruz-Gómez V, Jiménez-Alvarado R, Aguirre-Álvarez G. Collagen Hydrolysates for Skin Protection: Oral Administration and Topical Formulation. *Antioxidants (Basel)*. 2020;9(2):181. Published 2020 Feb 22. doi:10.3390/antiox9020181
- <sup>8</sup> de Miranda RB, Weimer P, Rossi RC. Effects of hydrolyzed collagen supplementation on skin aging: a systematic review and meta-analysis. *Int J Dermatol*. 2021;60(12):1449-1461. doi:10.1111/ijd.15518
- <sup>9</sup> Hexsel D, Zague V, Schunck M, Siega C, Camozzato FO, Oesser S. Oral supplementation with specific bioactive collagen peptides improves nail growth and reduces symptoms of brittle nails. *J Cosmet Dermatol*. 2017;16(4):520-526. doi:10.1111/jocd.12393
- <sup>10</sup> Bello AE, Oesser S. Collagen hydrolysate for the treatment of osteoarthritis and other joint disorders: a review of the literature. *Curr Med Res Opin*. 2006;22(11):2221-2232. doi:10.1185/030079906X148373
- <sup>11</sup> Clark KL, Sebastianelli W, Flechsenhar KR, et al. 24-Week study on the use of collagen hydrolysate as a dietary supplement in athletes with activity-related joint pain. *Curr Med Res Opin*. 2008;24(5):1485-1496. doi:10.1185/030079908x291967
- <sup>12</sup> Viguet-Carrin S, Garnero P, Delmas PD. The role of collagen in bone strength. *Osteoporosis Int*. 2006;17(3):319-336. doi:10.1007/s00198-005-2035-9
- <sup>13</sup> Zdzieblik D, Oesser S, König D. Specific Bioactive Collagen Peptides in Osteopenia and Osteoporosis: Long-Term Observation in Postmenopausal Women. *J Bone Metab*. 2021;28(3):207-213. doi:10.11005/jbm.2021.28.3.207
- <sup>14</sup> Budden T, Gaudy-Marqueste C, Porter A, et al. Ultraviolet light-induced collagen degradation inhibits melanoma invasion. *Nat Commun*. 2021;12(1):2742. Published 2021 May 12. doi:10.1038/s41467-021-22953-z
- <sup>15</sup> Nguyen HP, Katta R. Sugar Sag: Glycation and the Role of Diet in Aging Skin. *Skin Therapy Lett*. 2015;20(6):1-5
- <sup>16</sup> Paul C, Leser S, Oesser S. Significant Amounts of Functional Collagen Peptides Can Be Incorporated in the Diet While Maintaining Indispensable Amino Acid Balance. *Nutrients*. 2019;11(5):1079. Published 2019 May 15. doi:10.3390/nu11051079
- <sup>17</sup> Santa Cruz, Jamie. "Dietary Collagen - Should Consumers Believe the Hype?" *Today's Dietitian Magazine*, Mar. 2019, [www.todaysdietitian.com/newarchives/0319p26.shtml](http://www.todaysdietitian.com/newarchives/0319p26.shtml)
- <sup>18</sup> Kirmse M, Oertzen-Hagemann V, de Marées M, Bloch W, Platen P. Prolonged Collagen Peptide Supplementation and Resistance Exercise Training Affects Body Composition in Recreationally Active Men. *Nutrients*. 2019;11(5):1154. Published 2019 May 23. doi:10.3390/nu11051154
- <sup>19</sup> Khatri M, Naughton RJ, Clifford T, Harper LD, Corr L. The effects of collagen peptide supplementation on body composition, collagen synthesis, and recovery from joint injury and exercise: a systematic review. *Amino Acids*. 2021;53(10):1493-1506. doi:10.1007/s00726-021-03072-x
- <sup>20</sup> Clifford T, Ventress M, Allerton DM, et al. The effects of collagen peptides on muscle damage, inflammation and bone turnover following exercise: a randomized, controlled trial. *Amino Acids*. 2019;51(4):691-704. doi:10.1007/s00726-019-02706-5
- <sup>21</sup> Choi FD, Sung CT, Juhasz ML, Mesinkovsk NA. Oral Collagen Supplementation: A Systematic Review of Dermatological Applications. *J Drugs Dermatol*. 2019;18(1):9-16.2019;26(3):506-516. doi:10.2174/0929867325666171205170339