

Collagen Types 1 & 3



Collagen 1000mg, 180T

Supplement Facts

Serving Size 3 Tablets
Serving Per Container 60

	Amount Per Serving	% Daily Value
Calories	11	
Protein	3 g	5%**
(from Peptan® hydrolyzed collagen Types 1 and 3)		
Vitamin C (as calcium ascorbate)	30 mg	35%
Hydrolyzed Collagen	3 g (3000 mg) †	
Types 1 and 3 (as Peptan®, bovine)		

**Percent Daily Values are based on a 2,000 calorie diet.
† Daily Value not established.

Other Ingredients: Microcrystalline cellulose, stearic acid, croscarmellose sodium, magnesium stearate (vegetable source), hypromellose (coating).

Suggested Adult Use: Take 3 tablets twice daily on an empty stomach, at least 30 minutes before meals, or as recommended by a nutritionally-informed physician. To ensure optimal collagen absorption, avoid taking additional protein supplements within one hour of consumption.

Non-GMO / Gluten Free / Soy Free
Store in a cool dry place.

INGREDIENTS

Collagen is the major structural protein in connective tissue and the most abundant protein in the human body. As connective tissue performs the functions of binding and supporting, collagen is responsible for maintaining the strength and flexibility of bones, joints, skin, tendons, ligaments, hair, nails, blood vessels, and more.

Doctor's Best Collagen Types 1 & 3 contains pure collagen protein enzymatically hydrolyzed into component amino acids for optimal utilization by the body. Vitamin C, an essential co-factor required for collagen synthesis¹, is featured in the capsule and tablet forms of this formula. For quality and safety due to possible separation of ingredients, Vitamin C is not included in Doctor's Best Collagen Types 1 & 3 Powder; therefore, supplementing with a daily Vitamin C product (such as Doctor's Best Vitamin C) when using Doctor's Best Collagen Types 1 & 3 Powder is recommended.

Collagen Structure

Collagen is a long, fibrous protein that makes up the matrix of connective tissue. (Connective tissue consists of relatively few cells in a generous matrix, which is the ground substance and fibers between cells). The mesh of fibers formed by adjoining collagen molecules in tissues contributes to its structural and strength-giving properties². Collagen is arranged in a triple helix, lending sturdiness and integrity to the fiber matrix. Collagen molecules are particularly rich in the amino acids glycine, proline, hydroxylysine, and hydroxyproline—the latter two of which are rarely found in proteins other than collagen.³ While several other amino acid residues are contained within collagen, these four amino acids comprise over 50% of its structure.

Collagen and Normal Aging

Collagen synthesis is a continuous process throughout life. Rejuvenation and renewal of tissues throughout the body requires production of newly synthesized collagen; however, this process can become less efficient as we age, leading to decreased renewal of old tissue. For example, in human tendons, collagen cross-linking is lessened with each passing decade.³ While age may internally impact the efficiency of organ and tissue function, the most apparent manifestation of this process occurs externally. The

Collagen 1000mg, 540T

Supplement Facts

Serving Size 3 Tablets
Serving Per Container 180

	Amount Per Serving	% Daily Value
Calories	11	
Protein	3 g	5%**
(as hydrolyzed collagen Types 1 and 3)		
Vitamin C (as calcium ascorbate)	30 mg	35%
Hydrolyzed Collagen	3 g (3000 mg) †	
Types 1 and 3 (Bovine)		

**Percent Daily Values are based on a 2,000 calorie diet.
† Daily Value not established.

Other Ingredients: Microcrystalline cellulose, stearic acid, croscarmellose sodium, magnesium stearate (vegetable source), hypromellose (coating).

Suggested Adult Use: Take 3 tablets twice daily on an empty stomach at least 30 minutes before meals, or as recommended by a nutritionally-informed physician. To ensure optimal collagen absorption, avoid taking additional protein supplements within one hour of consumption.

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body's most visible tissue—and thus the most obvious place to observe the effects of aging—is the skin. Levels of type I & III collagen, as well as elastin, decrease in the dermis with age, resulting in loss of elasticity.⁴ This contributes to the appearance of wrinkles, fine lines, and an aged look, in addition to various skin blemishes and discoloration. The rate at which this occurs depends upon many factors, including genetics, hormonal changes, and environmental exposures (such as UV radiation from the sun or tobacco smoking—both of which can lead to increased breakdown of collagen in the skin and/or decreased synthesis of new collagen).^{5,6}

In conjunction with a nutritious diet, Doctor's Best Collagen Types 1 & 3 provides amino acids to support rejuvenation of the body's healthy structure as it ages and faces various daily stressors.

BENEFITS

- Superior Absorption
- Supports Healthy, Youthful Skin
- Supports Joint, Bone and Nail Health
- Supports Fitness, Exercise Recovery and Body Composition

Hydrolyzed Collagen Is Well Absorbed*

Collagen is characterized by its high content of glycine, proline and hydroxyproline, amino acids found to exert beneficial effects. However, to exert beneficial effects collagen must be well absorbed and bioavailable. Several studies have shown that hydrolyzed collagen is both well absorbed and bioavailable. A randomized, blinded, cross-over study with ten healthy male subjects receiving hydrolyzed collagen or placebo found that ingestion of collagen hydrolysates increases plasma concentrations of amino acids and enzymatic hydrolysis, the method used to produce Doctor's Best collagen, increases absorption rate and bioavailability.⁷ A similar study found hydroxyproline (Hyp)-containing peptides in human blood after collagen hydrolysate ingestion.⁸ Another study compared hydrolyzed and unhydrolyzed bovine collagen, finding that hydrolyzed collagen showed greater resistance to GI digestion and greater transport efficiency than the unhydrolyzed collagen control.⁹ Other researchers examined human absorption of ingested hydrolyzed collagen peptides, concluding that tripeptides, such as those hydrolyzed from collagen, are absorbed efficiently by the body.¹⁰ And a study found hydroxyproline-containing dipeptides and tripeptides at high concentration in human blood after ingestion of collagen hydrolysate, indicating that the collagen hydrolysate was well-absorbed.¹¹

Collagen for Healthy Skin*

Type I collagen is the major protein found in skin connective tissue, providing it with its tensile strength and resiliency.⁴ Type III collagen is found prominently in cardiovascular tissue and newly developing skin, and is essential for proper development of both. Types I & III collagen are often found together in the same tissues, as each form complements the structural integrity of the other. By providing types I & III collagen in a formula, Doctor's Best Collagen provides certain amino acids that are building blocks for these types of collagen in the body—building blocks for the growth, maintenance, and integrity of collagen-rich tissues.

Studies have shown that oral ingestion of collagen hydrolysate leads to elevated levels of collagen-derived peptides in the blood and research also shows that these peptides reach the skin. One study analyzed the plasma concentration of collagen-derived peptides after ingestion of collagen hydrolysate in humans. The study concluded that functional peptides can be transferred to the skin by collagen dietary supplements.¹² Moreover, research demonstrates that collagen has multiple beneficial effects on skin.

A double-blind, randomized, placebo-controlled human trial clinically evaluated the effect of collagen peptides (CP) on human skin hydration, wrinkling, and elasticity. Individuals ($n = 64$) were randomly assigned to receive either placebo or 1000 mg of CP once daily for 12 weeks. Skin hydration, wrinkling, and elasticity were assessed at baseline and after 6 and 12 weeks. None of the subjects presented adverse symptoms related to the CP during the study period. The researchers concluded that CP can



Collagen 500mg, 240C

Supplement Facts

Serving Size 4 Capsules
Servings Per Container 60

	Amount Per Serving	% Daily Value
Calories	7	
Protein	2 g	4%**
(from Peptan® hydrolyzed collagen Types 1 and 3)		
Vitamin C (as calcium ascorbate)	30 mg	35%
Hydrolyzed Collagen	2 g (2000 mg)	†
Types 1 and 3 (as Peptan®, bovine)		

**Percent Daily Values are based on a 2,000 calorie diet.
† Daily Value not established.

Other Ingredients: Microcrystalline cellulose, gelatin (capsule), magnesium stearate (vegetable source), silicon dioxide.

Suggested Adult Use: Take 4 capsules twice daily on an empty stomach at least 30 minutes before meals, or as recommended by a nutritionally-informed physician. To ensure optimal collagen absorption, avoid taking additional protein supplements within one hour of consumption.

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Collagen 200G

Supplement Facts

Serving Size 1 Scoop (~ 6.6 grams)
Servings Per Container Approximately 30

	Amount Per Serving	% Daily Value
Calories	24	
Protein	6 g	12%**
(as hydrolyzed collagen Types 1 and 3)		
Hydrolyzed Collagen	6.6 g (6600 mg)	†
Types 1 and 3 (Bovine)		

**Percent Daily Values are based on a 2,000 calorie diet.
† Daily Value not established.

Other Ingredients: None.

Suggested Adult Use: Dissolve 1 scoop of powder in a small amount of water or juice. Add an additional 6 - 8 oz. of liquid, mix well, and drink on an empty stomach at least 30 minutes before meals, or as recommended by a nutritionally-informed physician. To ensure optimal collagen absorption, avoid taking additional protein supplements within one hour of consumption.

NOTE: Some settling of contents may occur, affecting number of servings.

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be used to improve human skin hydration, elasticity, and wrinkling.¹³

Another study evaluated the effects of oral supplementation with hydrolyzed collagen through biophysical and skin imaging techniques. Sixty healthy female subjects, age 40–50 years, were enrolled in this placebo control trial. The stratum corneum water content, skin viscoelasticity, dermis echogenicity, and skin pores were evaluated. The study found that oral supplementation with hydrolyzed collagen improved skin elasticity and echogenicity (a measure of skin health), reducing skin pores after 90 days.¹⁴

Other researchers conducted a randomized, double-blind placebo-controlled clinical trial with ingestion of two types of collagen hydrolysates to investigate their effects on skin conditions. Improvement in skin conditions, such as skin moisture, elasticity, wrinkles, and roughness, were compared with a placebo group at baseline, and 4 and 8 weeks. In addition, safety of supplementation with these peptides was evaluated by blood test. Collagen hydrolysate showed significant and more improvement than placebo in facial skin moisture, elasticity, wrinkles and roughness. In addition, there were no adverse events during the trial.¹⁵

A separate study examined the effectiveness of collagen hydrolysate (CH) on skin biophysical parameters related to cutaneous aging. In this double-blind, placebo-controlled trial, 69 women age 35–55 years were randomized to receive CH or placebo once daily for 8 weeks. Skin elasticity, skin moisture, transepidermal water loss and skin roughness were measured before and after 4 and 8 weeks. Skin elasticity was also assessed 4 weeks after last CH intake. At the end of the study, skin elasticity in CH groups showed a significant improvement compared to placebo. Four weeks after treatment stopped, significantly higher skin elasticity was determined in elderly women. With regard to skin moisture and skin evaporation, a positive influence of CH was observed in a subgroup analysis. No side effects were noted throughout the study.¹⁶

A different study measured the photo-protective benefits and efficacy of an oral supplement containing collagen peptides and antioxidants to counteract signs of aging. A double-blind, randomized, placebo-controlled clinical trial was conducted by an independent esthetic clinic on 120 healthy volunteer subjects for 90 days. The study found a significant increase in skin elasticity and an improvement in skin texture after daily consumption of the supplement. The study also obtained positive patient feedback through self-assessment questionnaires. These results show that the supplement may have photo-protective effects and help improve skin health.¹⁷

A double-blind, placebo-controlled study assessed the effectiveness of collagen peptides (CP) on eye wrinkle formation and stimulation of procollagen I, elastin and fibrillin biosynthesis in human skin. A hundred and fourteen women age 45–65 years were randomized to receive CP or placebo daily for 8 weeks. The researchers concluded that oral intake of the collagen peptides used in the study reduced skin wrinkles and had positive effects on dermal matrix synthesis.¹⁸

Others investigated the effects of using a combination of collagen hydrolysate and astaxanthin supplementation on moderately photoaged skin in humans. A total of 44 healthy subjects were recruited and treated with collagen hydrolysate combined with astaxanthin or placebo for 12 weeks. The researchers concluded that collagen hydrolysate with astaxanthin can improve elasticity and barrier integrity in photoaged human facial skin, and such treatment is well tolerated.¹⁹

Support for Joint Comfort, Mobility, & Quality of Life*

Several recent joint health studies have been conducted in human populations using hydrolyzed collagen—the form of collagen in Doctor's Best Collagen Types 1 & 3. This ingredient may support the structure and function of cartilage, since about 60% of the dry weight of cartilage is composed of collagen; hydrolyzed collagen is well absorbed and supplies amino acid building blocks specific to joint cartilage. This is in contrast to collagen supplied by foods, which has not been hydrolyzed and therefore



Collagen 228G, Peach Flavored

Supplement Facts

Serving Size 1 Scoop (~ 7.6 grams)
Servings Per Container Approximately 30

	Amount Per Serving	% Daily Value
Calories	25	
Protein	6 g	12%**
(from hydrolyzed collagen Types 1 and 3)		
Hydrolyzed Collagen	6.6 g (6600 mg)	†
Types 1 and 3 (Bovine)		

**Percent Daily Values are based on a 2,000 calorie diet.
† Daily Value not established.

Other Ingredients: Natural flavor, citric acid, malic acid, stevia extract.

Suggested Adult Use: Dissolve 1 scoop of powder in 6 – 8 oz. of water. Drink on an empty stomach at least 30 minutes before meals, or as recommended by a nutritionally informed physician. To ensure optimal collagen absorption, avoid taking additional protein supplements within one hour of consumption.

NOTE: Some settling of contents may occur, which may cause slight variations in number of servings.

Gluten Free / Soy Free

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is not as well absorbed. Prior to 2009, researchers reported that a daily intake of hydrolyzed collagen for 60 days or longer can promote joint comfort²⁰ This led to a randomized, double-blind, placebo-controlled multicenter study of 250 participants in 2009. In the study, hydrolyzed collagen (or placebo) was taken each day for 6 months, and questionnaires were administered to assess changes in quality of life and joint comfort. Participants who took the hydrolyzed collagen and completed the study experienced superior joint comfort, and found it to be safe and well tolerated.²⁰

In a research trial of 97 young, healthy, physically active individuals at Penn State University, similar results were seen. The results of this randomized, double-blind study indicated that participants who consumed hydrolyzed collagen daily for 24 weeks experienced greater joint comfort than participants who took placebo. Of the 4 adverse events in the study, none were considered related to the administration of hydrolyzed collagen.²¹

A primary conclusion of this important study is that hydrolyzed collagen supplementation can potentially support joint health and comfort in the face of strenuous athletic activity. Preclinical research suggests that hydrolyzed collagen can pass intact into the body through the intestines and accumulate in cartilage tissue.²² The research also suggests hydrolyzed collagen can stimulate the production of the major protein in cartilage (type II collagen) and of proteoglycans in the matrix of cartilage.²³

In a randomized, double-blind, controlled pilot study, in which participants consumed either hydrolyzed collagen or placebo daily for 24 weeks, a new method of measuring proteoglycan concentration within hyaline (joint) cartilage was implemented. Using state of the art measurements, it was determined that hydrolyzed collagen affected cartilage structure after 6

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months of supplementation.²⁴

A study published in 2012 suggests that even modest doses of hydrolyzed collagen can support joint comfort. In this randomized, double-blind, controlled trial of 200 men and women, 1200 mg of either hydrolyzed collagen or placebo was administered daily. After 6 months, the group receiving hydrolyzed collagen fared better on a joint comfort response scale.²⁵

A double-blind, placebo-controlled, randomized trial with collagen peptides was carried out to study the effects of orally supplemented collagen peptides. Effects were assessed with reduction in Western Ontario McMaster Universities (WOMAC), visual analogue scale (VAS) and quality of life (QOL) scores from baseline to 13 weeks (Visit 7). Safety and tolerability were also evaluated. The study concluded that collagen peptides are potential therapeutic agents as nutritional supplements for maintenance of joint health.²⁶

Healthy Bones & Nails*

There are a number of different types of collagen, but the most prevalent two in the human body are types I & III. In fact, type I collagen is the most abundant protein in the human body, present in almost every type of tissue.² Bone contains almost exclusively type I collagen, its primary structural protein. Mineralization strengthens the collagen fiber network that makes up bone matrix.²⁷ However, with age the ability of bone to target and repair microcracks can decline, and furthermore, there can be an age-related decrease in bone collagen content. It is important to maintain collagen as we age in order to preserve bone strength.²⁸

A study investigated the effect of 12-month daily oral administration of 5 g collagen peptides (CP) vs. placebo (CG: control group) on Bone Mineral Density (BMD) in postmenopausal women with primary, age-related reduction in BMD. Methods: 131 women were enrolled in this randomized, placebo-controlled double-blinded investigation. The study concluded that intake of CP increased BMD in postmenopausal women with primary, age-related reduction of BMD. In addition, CP supplementation was associated with a favorable shift in bone markers, indicating increased bone formation and reduced bone degradation.²⁹

Another study examined the in vitro effects of collagen hydrolysate (CH) on bone health and in vivo experiments confirmed the positive effects of CH in rats. Bone mineral density (BMD) was examined by DXA analysis. Scanning electron microscopic analysis and quantitative 3D-color backscattered electrons imaging analysis were performed on the lumbar vertebrae. CH increased osteoblastic cell proliferation and alkaline phosphatase activity in a dose-dependent manner. Collagen synthesis and collagen, type1, alpha1 (COL1A1) gene expression were also increased by CH. Rats supplemented with CH showed osteoprotective effects as the BMD levels were increased compared with control. Moreover, CH prevented trabecular bone loss and improved the microarchitecture of lumbar vertebrae.³⁰

Other researchers investigated the absorption mechanism of collagen hydrolysate (CH) and its effects on bone markers in rats. CH was absorbed into the blood of Wistar rats in the peptide form. Peptides remained in the plasma and accumulated in the kidney. In both groups, peptide markers were retained at a high level in the skin until 14 days after administration. The researchers concluded CH exerts a beneficial effect by increasing the organic substance content of bone.³¹

A separate study investigated whether daily oral supplementation with collagen peptides alleviates the symptoms of brittle nails and improves nail growth rate. In this open-label, single-center trial, 25 participants took 2.5 g of collagen peptides CP once daily for 24 weeks followed by a 4-week off-therapy period. Nail growth rate and frequency of cracked and/or chipped nails as well as an evaluation of symptoms and global clinical improvement score of brittle nails were assessed by a physician during treatment and 4 weeks after discontinuation. The study concluded that daily ingestion of CP increased nail growth and improved brittle nails in conjunction with a notable decrease in the frequency of broken nails.³²

Fitness, Exercise Recovery and Body Composition*

A study was designed to determine the effects of three forms of collagen on N-terminal peptide of procollagen and serum amino acid levels. A total of 10 recreationally-active males completed a randomized double-blinded crossover design study consuming either placebo or vitamin C-enriched gelatin or hydrolyzed collagen (HC), or gummy containing equal parts of gelatin and HC. Supplements were consumed 1 hr before 6 min of jump rope. Blood samples were collected immediately prior to supplement consumption and 4 hr after jump rope. The study concluded that vitamin C-enriched gelatin and HC supplementation may improve collagen synthesis when taken 1 hr prior to exercise.³³



Another study examined whether consuming collagen peptides (CP) before and after strenuous exercise alters markers of muscle damage, inflammation and bone turnover. Using a double-blind, independent group's design, 24 recreationally-active males consumed either daily CP or a placebo control (CON) for 7 days before and 2 days after performing 150 drop jumps. The study concluded that CP had moderate benefits for the recovery of CMJ and muscle soreness.³⁴

Other research investigated the effectiveness of collagen peptide supplementation (CP) to improve ankle stability in athletes. 50 male and female athletes completed a randomized, double-blinded and placebo-controlled study with daily oral administration of either CP or placebo for six months. Both, the Cumberland Ankle Instability Tool (CAIT) and the German version of the Foot and Ankle Ability Measure (FAAM-G) were used to measure the subjective perceived function of the ankle. Additionally, the mechanical stability was determined by measuring the ankle stiffness by an ankle arthrometer. Finally, a three-month follow-up was performed. These data support the concept that specific collagen peptide supplementation in athletes results in significant improvements in subjective perceived ankle stability. The researchers also found a reduction in re-injury of ankle sprains in the follow-up period.³⁵

Another research effort aimed to determine the effects of long-term collagen peptide (CP) supplementation and resistance exercise training (RET) on body composition, strength, and muscle fiber cross-sectional area (fCSA) in recreationally-active men. Fifty-seven men were randomly and double-blinded divided into a group receiving either collagen peptides (COL) or placebo (PLA). Strength testing, bioimpedance analysis, and muscle biopsies were used prior to and after an RET intervention. The researchers found improved body composition in healthy, recreationally-active men subsequent to prolonged CP supplementation in combination with RET.³⁶

A double-blind, placebo-controlled clinical study investigated the efficacy of collagen peptides (CP) on cellulite in normal and overweight women. In total, 105 women aged 24-50 years with moderate cellulite were randomized to orally receive daily CP or placebo for 6 months. The results of the study demonstrated that regular ingestion of CP for 6 months led to a clear improvement of skin appearance in women with moderate cellulite. The study concluded that long-term therapy with orally-administered CP leads to improvement of cellulite and has a positive impact on skin health.³⁷

A separate study assessed the influence of post-exercise protein supplementation with collagen peptides v. placebo on muscle mass and muscle function following resistance training in elderly subjects with sarcopenia. A total of fifty-three male subjects (72.2 (sd 4.68) years) with sarcopenia (class I or II) completed this randomized, double-blind, placebo-controlled study. Participants underwent a 12-week guided

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resistance training program and were supplemented with either collagen peptides (treatment group (TG)) or silica as placebo (placebo group (PG)). Fat-free mass (FFM), fat mass (FM) and bone mass (BM) were measured before and after the intervention using dual-energy X-ray absorptiometry. Isokinetic quadriceps strength (IQS) of the right leg was determined and sensory motor control (SMC) was investigated by a standardized one-leg stabilisation test. The study concluded that, compared with placebo, collagen peptide supplementation in combination with resistance training further improved body composition by increasing FFM and muscle strength and reducing FM.³⁸

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