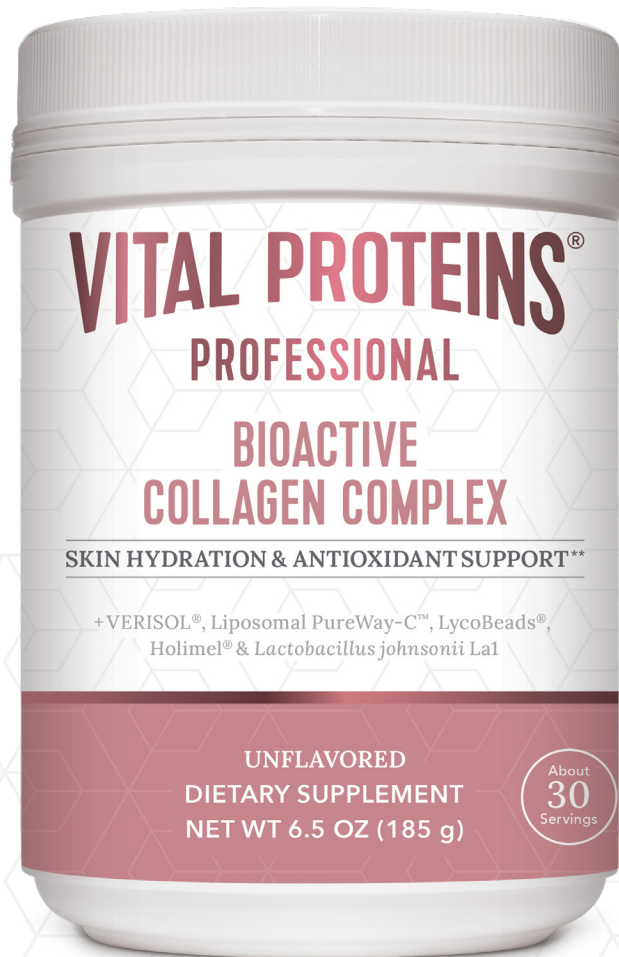


# VITAL PROTEINS<sup>®</sup>

## PROFESSIONAL



## BIOACTIVE COLLAGEN COMPLEX

**SKIN HYDRATION AND ANTIOXIDANT SUPPORT\*\***

Product and Research Guide for Healthcare Professionals

\*\* 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.



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# BIOACTIVE COLLAGEN COMPLEX

## SKIN HYDRATION AND ANTIOXIDANT SUPPORT\*\*

A daily supplement featuring a combination of clinically-backed ingredients, each proven to promote skin health.\*\*

- ✓ Reduces appearance of fine lines and wrinkles\*\*<sup>1</sup>
- ✓ Boosts skin elasticity\*\*<sup>1</sup>
- ✓ Hair and nail support\*\*
- ✓ Enhances skin resilience to environmental stressors\*\*
- ✓ Boosts antioxidant expression\*\*
- ✓ Supports skin hydration\*\*
- ✓ Promotes collagen synthesis\*\*



### Supplement Facts

Serving Size 1 Scoop (5 g)  
Serving Per Container About 30

	Amount Per Serving	% Daily Value
Calories	20	
Protein	4 g	0%
Vitamin C (As PureWay-C® Liposomal Vitamin C)	90 mg	100%
Sodium	30 mg	1%

VERISOL® Collagen Peptides (From bovine)	5 g	
Hyaluronic Acid (From sodium hyaluronate)	120 mg	
Lactobacillus johnsonii La1 (1 Billion CFUs †)	100 mg	
Water†	20 mg	
Melon Cucumis melo fruit juice concentrate		
Liposome	10 mg	
From LycoBeads® Natural Tomato Lycopene		

†Dietary fiber (DF) are based on a 2,000-calorie diet. †% Daily Value are not established.

### TYPICAL AMINO ACID PROFILE

(Average milligrams per serving naturally occurring)

Alanine	287 mg	Valine**	142 mg
Arginine	324 mg	Methionine**	41 mg
Aspartic Acid	261 mg	Phenylalanine**	93 mg
Cysteine	659 mg	Proline	172 mg
Glycine	999 mg	Serine	141 mg
Glutamic Acid	65 mg	Threonine**	81 mg
Hydroxylysine	72 mg	Tyrosine**	0 mg
Hydroxyproline	536 mg	Tyrosine	36 mg
Isoleucine**	63 mg	Valine**	101 mg
Isoleucine**	522 mg		

### Contains 8 of 9 Essential Amino Acids

Note: LycoBeads® Natural Tomato Lycopene contributes a light pink color when mixed in clear liquids.

If you are pregnant, nursing or have a medical condition, consult your physician before use.

Storage Information: Store in a cool, dry place. Do not use if safety seal is broken or missing.

VERISOL® is a registered trademark of CELESTA AG.

PUREWAY-C™ and the PUREWAY-C logo are trademarks of One Innovation Labs, LLC in the U.S. and/or other countries.

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DISTRIBUTED BY:  
VITAL PROTEIN LLC, 3400 WOLF ROAD STE. 200  
BRIDGE PLAZA, L4103  
This product is manufactured in a facility that  
processes milk, fish and tree nuts.  
DIRECTIONS: As a dietary supplement, mix 1 scoop  
(5 g) of liquid like coffee, milk, smoothies, or as  
served by your healthcare practitioner.  
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 Mix in Hot or Cold Liquids	 Grass Fed & Pasture Raised
 Made Without Gluten	 Made Without Dairy
 Made With Non-GMO Ingredients	 Made With Bovine Collagen Peptides

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<sup>1</sup> After 8 week supplementation with VERISOL®

## RECOMMENDED USE

- As a dietary supplement, mix one scoop in eight ounces of liquid—like coffee, water, or smoothie—and consume every day
- Available as an unflavored powder that easily dissolves in hot or cold liquids, it can conveniently complement your client's daily wellness regimen
- Lacking tryptophan, this supplement is not considered a complete protein. Therefore, it should be recommended as a complement to your client's current protein intake
- While individual results vary, we recommend consuming this supplement daily for at least 8 weeks based on current clinical research findings
- This supplement can be used any time of day, and may be taken with or without food

## POTENTIAL CLIENTS

BIOACTIVE COLLAGEN COMPLEX *Skin Hydration and Antioxidant Support*\*\* is a multi-benefit supplement intended for individuals wanting to optimize collagen status and support skin health and resilience to environmental stressors.\*\*

With clinically tested VERISOL®, hyaluronic acid, Holimel® melon extract, LycoBeads® and *Lactobacillus Johnsonii* (LA1), clients will be confident they are receiving the same molecular forms and amounts of these ingredients used in efficacy trials.

- Clients looking for collagen to support skin hydration and reduce fine lines\*\*
- Health-seeking clients wishing to augment their skin's resilience to environmental stressors\*\*
- Clients who are actively seeking a holistic approach to long term skin health
- Clients seeking a supplement made with clinically-backed ingredients in efficacious amounts

## PRECAUTIONS / CONTRAINDICATIONS

- If your client is pregnant, nursing or has a medical condition, use your clinical judgement to determine if this product should be included in their wellness protocol
- Protein contribution should be considered for individuals that need to restrict total dietary protein

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## ABOUT BIOACTIVE COLLAGEN COMPLEX SKIN HYDRATION AND ANTIOXIDANT SUPPORT\*\*

BIOACTIVE COLLAGEN COMPLEX *Skin Hydration and Antioxidant Support*\*\* offers a clinically-backed, comprehensive approach to skin health. Developed with a team of leading nutrition experts, this daily supplement is made with clinically demonstrated amounts of functional ingredients designed to support skin structure and hydration, and increase its resilience to environmental stressors.\*\*

### BIOACTIVE COLLAGEN COMPLEX *Skin Hydration and Antioxidant Support*\*\*:

- Has been developed with a team of leading nutrition experts
- Features a formulation made with clinically-backed ingredients in efficacious amounts
- Is available in a compliance-friendly format (odorless powder that easily dissolves when mixed with hot or cold liquids)

### Ingredients / Benefits / Mechanism of Action (MOA)

High-quality, natural ingredients with proven clinical capabilities make BIOACTIVE COLLAGEN COMPLEX *Skin Hydration and Antioxidant Support*\*\* a professional grade supplement for the support of the skin.\*\* The ingredients function via multiple mechanisms and have been clinically shown to promote positive outcomes.\*\*

Ingredient	Benefits	MOA
VERISOL®	<ul style="list-style-type: none"> <li>• Reduces appearance of fine lines and wrinkles**<sup>1</sup></li> <li>• Boosts skin elasticity**<sup>1</sup></li> <li>• Improves nail growth**<sup>2</sup></li> <li>• Increases hair thickness**<sup>3</sup></li> </ul>	<p>VERISOL® stimulates the fibroblast cells in the dermal layer of the skin to increase their collagen production.** This results in higher production of dermal collagen to help combat what is lost through aging and environmental influences** (Proksch, 2014a).</p>
PureWay-C™ Liposomal Vitamin C	<ul style="list-style-type: none"> <li>• Promotes collagen synthesis**</li> </ul>	<p>Collagen synthesis is highly dependent upon the presence of antioxidant vitamin C, driving the hydroxylation of proline and lysine in collagen throughout the body. By binding ascorbic acid to lipid metabolites, PureWay-C™ Liposomal Vitamin C has been clinically shown to be more rapidly absorbed by the body and retained for longer periods of time than other forms of vitamin C (Weeks, 2007).</p>

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<sup>1</sup> After 8 week supplementation with VERISOL®

<sup>2</sup> After 6 month supplementation with VERISOL®

<sup>3</sup> After 16 week supplementation with VERISOL®

Ingredient	Benefits	MOA
Holimel® Melon Juice Concentrate	<ul style="list-style-type: none"> <li>Boosts antioxidant expression**</li> </ul>	<p>Holimel® is a patented melon juice concentrate rich in the powerful antioxidant superoxide dismutase, or SOD. In clinical trials, Holimel® has been shown to boost the skin's natural antioxidant defenses (SOD, catalase, and glutathione peroxidase), making them available to counter negative reactions caused by environmental stressors and the natural aging process** (Egoumenides, 2018).</p>
Lycobeads® Natural Tomato Lycopene	<ul style="list-style-type: none"> <li>Enhances skin resilience to environmental stressors**</li> </ul>	<p>Lycobeads® Natural Tomato Lycopene is a carotenoid-rich extract from carefully bred, non-GMO tomatoes. By mitigating the production of inflammatory mediators and cytokines** (Hadad 2012, Kim 2011), this antioxidant ingredient has been shown in clinical studies to increase levels of lycopene in serum and carotenoids in skin** (Aust, 2005).</p>
<i>Lactobacillus johnsonii</i> (LA1)	<ul style="list-style-type: none"> <li>Enhances skin resilience to environmental stressors**</li> </ul>	<p><i>Lactobacillus johnsonii</i> (LA1) is a live probiotic. While the exact mechanism of action is unclear, it's speculated that LA1 modulates local or systemic cytokine levels, favorably modifying the gut microbiome (Garrido, 2005) and therefore supporting dermal immune function** (Peguet-Navarro, 2008).</p>
Hyaluronic acid	<ul style="list-style-type: none"> <li>Supports skin hydration**</li> </ul>	<p>The fullness, pliability and turgor of youthful skin is due in part to its high water content. Hyaluronic acid, the primary molecule involved in skin moisture, has a remarkable capacity to bind water (Kawada, 2014). It's absorbed via the lymphatic system and the blood, potentially involving anaerobic fermentation in the large intestine (Hisada 2008, Ahn 1998). Trials of ingested hyaluronic acid have demonstrated an increase in skin moisture, at an average intake of 120mg/day. (Kawada, 2014)</p>

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# FAQ



## How is BIOACTIVE COLLAGEN COMPLEX *Skin Hydration and Antioxidant Support*\*\* different from VITAL PROTEINS Collagen Peptides?

- It was formulated with a team of leading nutrition experts
- It contains VERISOL®, bioactive collagen peptides that were specifically designed to deliver clinical results to skin\*\*
- In addition to VERISOL®, it also delivers clinically-tested Holimel® melon juice concentrate, LycoBeads®, *Lactobacillus johnsonii* (LA1), hyaluronic acid and PureWay-C™ Liposomal Vitamin C

Specific production controls for collagen peptides and product characteristics are shown below:

Collagen Peptide Complex	Source of Intact Collagen	Enzymes Used in Hydrolysis	Time and Temperature of Hydrolytic Enzymatic Bath	Amino Acid Cleavage Locations	Mean Molecular Weights	Bioactive	Activation of Cell Types	Tissues Supported
FORTIGEL®	Bovine Hide	Constant	Constant	Specific	3kD	Yes	Chondrocytes	Cartilage, tendons
FORTIBONE®	Bovine Hide	Constant	Constant	Specific	5kD	Yes	Osteoblasts	Bone
VERISOL®	Bovine Hide	Constant	Constant	Specific	2kD	Yes	Fibroblasts, keratinocytes	Skin, hair, nails
Collagen Peptides	Bovine Hide	Variable	Variable	Nonspecific	3-5kD	Yes	Chondrocytes Osteoblasts Fibroblasts keratinocytes	Cartilage, tendons, bones, skin, hair, nails

### How can my clients incorporate it into their cold beverages without clumping?



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**Why does my water turn pink when I add BIOACTIVE COLLAGEN COMPLEX  
*Skin Hydration and Antioxidant Support*\*\*?**

Lycobeads® Natural Tomato Lycopene contributes a light pink color when added to clear liquids.

**Can I recommend this to someone with a confirmed beef allergy?**

To date, we aren't aware of double-blind, placebo-controlled food challenge studies that investigate the effect of collagen peptides on individuals with a confirmed beef allergy. Therefore, we recommend working directly with your client to determine if this product should be a part of their wellness regimen.

**How long should it be taken?**

Measurable results have been seen in as early as 4-8 weeks for skin outcomes;\*\* however, we recommend daily use of this product as part of a long term wellness routine to support continued benefits.

**Can I recommend this product with other VITAL PROTEINS products?**

Because each individual has unique nutritional needs, please review the supplement fact panel of any Vital Proteins Professional product before recommending it, alone or in combination with other supplements.

**Why can't I just recommend clients to consume a diet rich in fruits and vegetables to get the benefits that yield resilience to environmental stressors?**

A diet rich in fruits and vegetables is important to overall health, including antioxidant status. However, the specific photo-protective ingredients coming from Holimel® and LycoBeads® come from extracts of specially bred, non-GMO melons and tomatoes with highly concentrated antioxidant components.

For example, the amount of LycoBeads® in one serving of BIOACTIVE COLLAGEN COMPLEX *Skin Hydration and Antioxidant Support*\*\* is equivalent to that found in four lycopene-rich tomatoes.

**Does *Lactobacillus johnsonii* (LA1) survive the stomach acid?**

Yes, *Lactobacillus johnsonii* (LA1) has been shown to survive throughout the intestinal tract and help support a healthy gut microbiota.\*\* In doing so, it also supports the immune system.\*\*

**Could BIOACTIVE COLLAGEN COMPLEX *Skin Hydration and Antioxidant Support*\*\* impair Vitamin D status?**




No, taking this product does not interfere with vitamin D status.

**Does BIOACTIVE COLLAGEN COMPLEX *Skin Hydration and Antioxidant Support*\*\* replace the need for sunscreen and/or sun protective clothing?**

While the ingredients in the product help support the skin's natural resilience to environmental stressors,\*\* they do not replace the need for sunscreen and UV-protective clothing.

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I've seen other Vital Proteins Professional products available. Do you have a comparison chart of the line?

	 <b>Daily Foundational Support**</b>	 <b>Bone and Joint Support**</b>	 <b>Skin Hydration and Defense Support**</b>
Clinical indications	<p>Clients looking for collagen to support their skin, bone and joint health**</p> <p>Active clients wishing to proactively optimize their physical mobility as they age (40+)**</p> <p>“Collagen curious” clients seeking collagen supplementation made with clinically-backed ingredients in efficacious amounts</p>	<p>Women seeking supplementation to increase bone mineral density**</p> <p>Healthy aging clients seeking to improve their mobility**</p> <p>Athletes of all levels looking to proactively and reactively support their bones and joints**</p> <p>Clients wanting additional functional ingredients to support their bone health** beyond calcium and vitamin D</p> <p>Clients seeking a supplement made with clinically-backed ingredients in efficacious amounts</p>	<p>Clients looking for collagen to support skin hydration and reduce fine lines**</p> <p>Health-seeking clients wishing to augment their skin’s resilience to environmental stressors**</p> <p>Clients who are actively seeking a holistic approach to long term skin health**</p> <p>Clients seeking a supplement made with clinically-backed ingredients in efficacious amounts</p>
Bioactive Collagen Peptides	VERISOL®, FORTIGEL®, FORTIBONE®	FORTIGEL®, FORTIBONE®	VERISOL®
Additional supportive ingredients	PureWay-C™ Liposomal Vitamin C	PureWay-C™ Liposomal Vitamin C, Mobilee®, calcium citrate, vitamin K2, vitamin D3	PureWay-C™, Holimel® melon juice concentrate, LycoBeads®, <i>Lactobacillus johnsonii</i> (LA1), hyaluronic acid

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# ABOUT COLLAGEN

## What Is Collagen?

Collagen is the most abundant protein in the body, making up approximately 30% of total protein composition. Based on the Greek word for glue, or “kóllo,” collagen serves to connect and hold together the body’s structures. Bones, joints, muscles, tendons, and ligaments rely on collagen for their structure, tensile strength and cohesion. Collagen also plays fundamental roles in blood vessels, cornea and teeth. Collagen gives skin a full and youthful appearance, housing the elastin that supports skin’s elasticity, and hyaluronic acid, which retains skin’s moisture.




Collagen is composed of three long and intertwined coiled strands, each of which is made up of over 1000 amino acids. Unique to collagen is the prominence of glycine, proline and hydroxyproline, amino acids that make up about one-third of the collagen molecule. Collagen contains all the essential amino acids, except for tryptophan (Paul, 2019).

### **Why Collagen Supplementation?**

There are two primary factors driving the need for collagen supplementation. First, biosynthesis of collagen begins to decline in the third decade of life and can contribute to loosening and thinning of the skin, reduction of joint flexibility, and a gradual decrease in joint mobility and functionality. Secondly, dietary collagen intake is generally low. Centuries ago, people utilized bones, broth, organs and tendons to enrich the diet with whole animal sources of collagen nutrition. Today, in contrast, individuals are gravitating towards veganism, vegetarianism, and diets rich in lean muscle meat. Collagenous parts of the animal, like the skin, cartilage and bones, are often discarded.

### **Why Collagen Peptides?**

Collagen peptides are the most bioavailable grade of collagen. The bioavailability and activity of collagen depends upon its form. Native collagen is an intact, triple helix molecule that's insoluble, resistant to absorption and digestibility, and is used primarily for medical purposes. Gelatin, a product of heat-treated collagen, is more bioavailable than intact collagen, but is less likely to become fully broken down into peptides small enough for absorption. Collagen peptides have lower molecular weights and are over 90% bioavailable, with peptides appearing in the bloodstream an hour after ingestion (Ichikawa 2010, Iwai 2005). Collagen types with their associated solubilities, absorption capabilities and applications are featured in the table below.

Grade	Form	Solubility	Absorption & Digestibility	Application Examples
Native Collagen		Insoluble	None	Medical materials, collagen casings
Gelatin		Medium	Low	Gelatin desserts, confectionery
Collagen Peptides		High	High	Dietary supplements, functional foods

Completely hydrolyzed by water and a proteolytic enzymatic bath, collagen peptides are more soluble, bioavailable and versatile than the other forms. They completely dissolve when added to hot or cold liquids, and their low molecular weight helps the body easily digest and absorb them. In addition to being a bioavailable source rich in key amino acids, like glycine, proline and hydroxyproline, collagen peptides also appear to have bioactive properties that support the body's production of collagen (GELITA, AG).

### Why VERISOL®?

Skin cells, or fibroblasts, have distinct characteristics. VERISOL® was designed with a unique peptide distribution and mean molecular weight to stimulate collagen production in the skin. The specific effects of bioactive peptides on cell types, including fibroblasts, remain under active investigation.

Collagen	Cell Types Supported	Health Benefits	Mean Molecular Weight	Effective Daily Amount
VERISOL®	Fibroblasts	Skin, hair and nails**	2 kDa	2.5g

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# THE RESEARCH



## **VERISOL®: CLINICALLY-PROVEN TO SUPPORT SKIN HEALTH\*\***

Skin is the body's largest organ and is vital to overall health, serving as a physical barrier, regulating body temperature, and producing vitamin D. The condition of skin changes, based on one's age, diet, lifestyle, and other environmental factors. As with all organs, skin undergoes chronological, or intrinsic, aging. Unique from other organs, the skin is in direct contact with the world around us and ages as a result of extrinsic environmental stressors, in particular UVA and UVB irradiation from the sun. Healthy skin is an important component of overall wellness and a major element of outward beauty.

Collagen comprises 75% of the protein in the skin (Wulf, 2004). With increasing age, changes in hormone status, and a decrease in collagen production, skin becomes drier and loses its volume and elasticity. This leads to a reduction in firmness, an increase in fine lines and eventually pronounced wrinkles. Targeting both chronological and photo-aging effects via use of collagen peptides, vitamin C and select nutraceuticals may help promote improvements in the condition and appearance of skin.

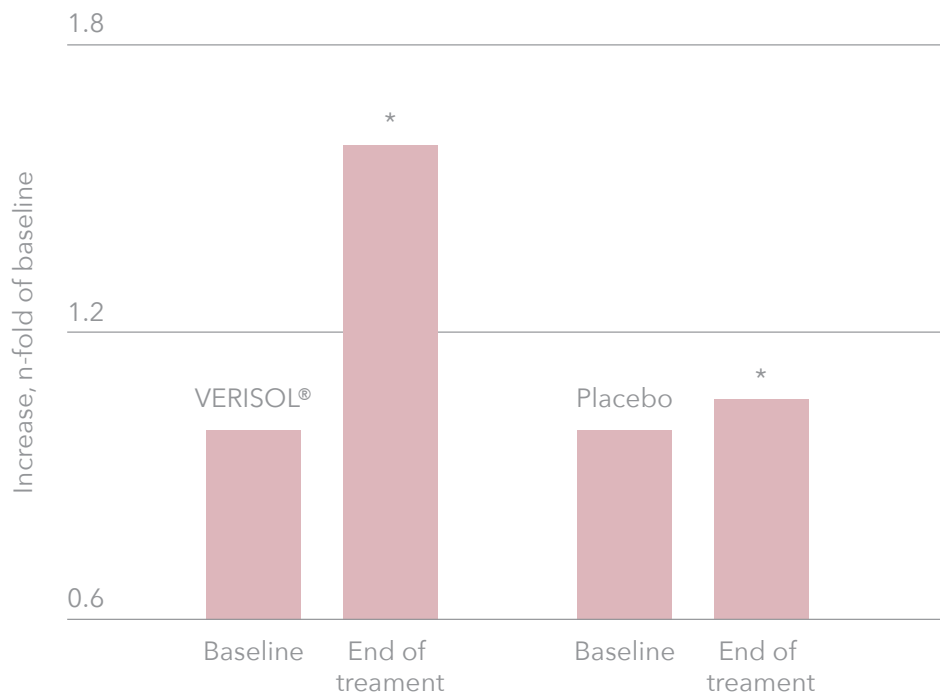
Substantial evidence supports the benefits of collagen peptide supplementation for skin (Ohara 2010, Choi 2019, Miranda 2021). In a meta-analysis of 19 randomized clinical trials evaluating 1,125 patients, substantial improvements in skin characteristics were seen in patients receiving collagen peptides compared to patients receiving placebos. Collagen peptides were significantly associated with increased skin hydration, improved dermal elasticity, and reduced wrinkles (Miranda, 2021).



**VERISOL® has been clinically shown to improve the condition of the skin as demonstrated in two randomized, double-blind, controlled trials, as described below.**

In a trial of more than 100 women aged between 45-65 years, oral administration of VERISOL® significantly reduced wrinkles after 4 weeks, and led to significantly higher concentrations of skin procollagen (Fig. 1) (Proksch, 2014a).

*Fig.1 Increase in dermal procollagen accumulation with VERISOL® (Proksch, 2014a)*

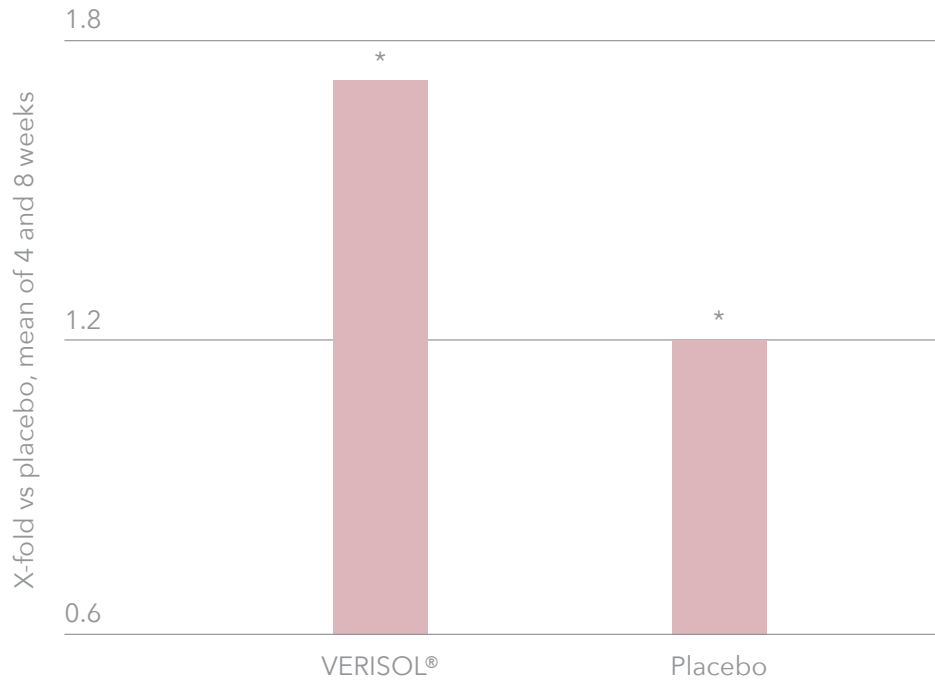


*VERISOL® promoted a 65% increase in procollagen accumulation in skin, significantly greater than placebo, \*p<0.05*

In a separate trial, 69 women aged 35-55 were randomized to receive VERISOL® or a placebo for 8 weeks. At 4 weeks, women in the VERISOL® group had significantly higher skin elasticity (Fig. 2) and this difference was also observed at 8 weeks. The improved elasticity, as compared to the placebo group, persisted 4 weeks after discontinuation of the product (Proksch, 2014b).

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Fig 2. Increased skin elasticity with VERISOL® (Proksch, 2014b)



Mean increase in skin elasticity with VERISOL® \* $p < 0.05$

While support of the skin is an obvious target for VERISOL® collagen peptides, fingernails are also dependent on collagen. VERISOL® collagen peptides have been clinically tested for their effects on the growth and strength of fingernails. In a study of women with a history of slow nail growth and nail breakage, daily use of VERISOL® collagen peptides resulted in significant increases in nail growth, and a 42% reduction in nail splitting (Hexsel, 2017).

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## References

- Ahn M. Characterization of a *Bacteroides* species from human intestine that degrades glycosaminoglycans. *Can J Microbiol* 1998, 44:423-429.
- Aust O, et al. Supplementation with tomato-based products increases lycopene, phytofluene, and phytoene levels in human serum and protects against UV-light-induced erythema. *Int J Vitam Nutr Res*. 2005 Jan;75(1):54-60.
- Choi F, et al. Oral collagen supplementation: a systematic review of dermatologic applications. *J of Drugs in Dermatology*. 2019;18(1):9-16.
- Egoumenides L, et al. A specific melon concentrate exhibits photoprotective effects from antioxidant activity in healthy adults. *Nutrients* 2018, 10, 437.
- Garrido D, et al. Modulation of the fecal microbiota by the intake of a *Lactobacillus johnsonii* LA1- containing product in human volunteers. *FEMS Microbiology Letters* 248 (2005) 249-256.
- Pullar J, et al. The roles of vitamin C in skin health. *Nutrients*. 2017;9: 866.
- GELITA AG, Data on file.
- Hadad N, et al. The synergistic anti-inflammatory effects of lycopene, lutein, b-carotene, and carnosic acid combinations via redox-based inhibition of NF-kB signaling. *Free Radical Biology and Medicine*. 2012;53:1381-1391.
- Hexsel D. Oral supplementation with specific bioactive collagen peptides improves nail growth and reduces symptoms of brittle nails. *J Cosmet Dermatol*. 2017;00:1-7.
- Hisada N. Low-molecular-weight hyaluronan permeates through human intestinal Caco-2 cell monolayers via the paracellular pathway. *Biosci Biotechnol Biochem* 2008, 72(4):1111-1114.
- Ichikawa S. et al. Hydroxyproline-containing dipeptides and tripeptides quantified at high concentration in human blood after oral administration of gelatin hydrolysate. *International Journal of Food Sciences and Nutrition*. 2010; 61(1): 52-60.
- Iwai K. et al. Identification of food-derived collagen peptides in human blood after oral ingestion of gelatin hydrolysates. *J. Agric. Food Chem*. 2005, 53, 6531-6536.
- Kawada et al. Ingested hyaluronan moisturizes dry skin. *Nutrition Journal*. 2014;13:70.
- Kim J, et al. Effects of lycopene supplementation on oxidative stress and markers of endothelial function in healthy men. *Atherosclerosis*. 2011;215:189-195.
- Miranda R, et al. Effects of hydrolyzed collagen supplementation on skin aging: a systematic review and meta-analysis. *Int J Dermatology*. 2021; Mar 20. doi: 10.1111/ijd.15518.
- Ohara, 2010. Collagen-derived dipeptide, proline-hydroxyproline, stimulates cell proliferation and hyaluronic acid synthesis in cultured human dermal fibroblasts *Journal of Dermatology* 2010;37:330-33.
- Paul C, et al. Significant amounts of functional collagen peptides can be incorporated in the diet while maintaining indispensable amino acid balance. *Nutrients*. 2019;11(5): 1079
- Peguet-Navarro J, et al. Supplementation with oral probiotic bacteria protects human cutaneous immune homeostasis after UV exposure-double blind, randomized, placebo controlled clinical trial. *Eur J Dermatol*. 2008;18(5):504-11.
- Proksch E. et al (a). Oral Intake of Specific Bioactive Collagen Peptides Reduces Skin Wrinkles and Increases Dermal Matrix Synthesis *Skin Pharmacol Physiol* 2014;27:113-119.
- Proksch E, et al (b). Oral Supplementation of Specific Collagen Peptides Has Beneficial Effects on Human Skin Physiology: A Double-Blind, Placebo-Controlled Study 2014. *Skin Pharmacol Physiol* 2014;27:47-55.
- Weeks B. Absorption rates and free radical scavenging values of vitamin C-lipid metabolites in human lymphoblastic cells. *Med Sci Monit*. 2007; 13(10):BR205-210.
- Wulf HC, et al. Skin aging and natural photoprotection. *Micron*.2004; 35:185-191.