Bioavailability of Collagen Peptides

Collagen is a protein that helps support the structure of our tissues. Collagen is present in bone, connective tissue, organs, skin, hair, and nails. Collagen is the most abundant protein in the human body and contributes to our ability to move well as we age. It's also an important contributor to the health and appearance of the hair, skin, and nails.

Collagen is constantly being recycled by the body. Our bodies naturally degrade collagen over time in order to replace it with new, more functionally sound collagen. As we age, the rate of collagen depletion begins to outpace its replacement. This is where collagen peptides come in. By providing the raw materials needed for collagen production and boosting the body's intrinsic production of collagen, taking collagen peptides increases tissue strength and density all over the body, improving the health of those tissues.

What is Bioactivity?

Bioactivity is a term used to describe the ability of a supplement to cause a reaction within your body. Supplementing with collagen causes a reaction that increases your body's own production of collagen, which is why it is considered a bioactive supplement.

What is Bioavailability?

Bioavailability refers to the ease with which a compound is absorbed by the body. Collagen peptides are particularly bioavailable because they have been hydrolyzed into smaller molecules, delivering the collagen in its most active form, which can be easily utilized by the body.

Importance of Bioavailability and Bioactivity in Nutritional Supplements

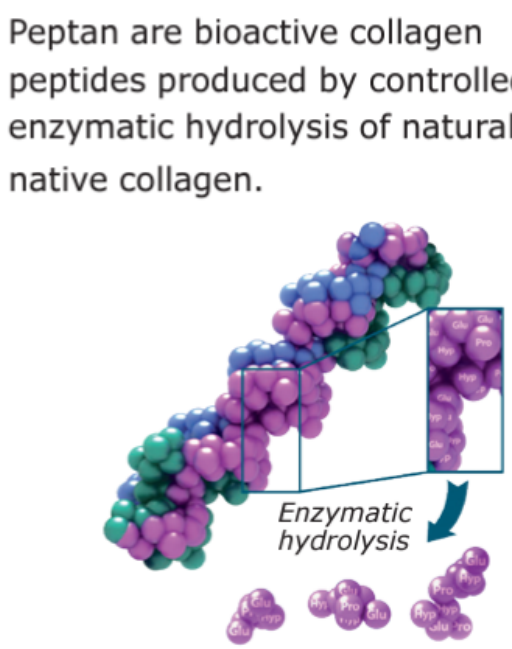
For a supplement to work well, it's important that it's in its most accessible form for the body to use so that it causes the intended reaction, causing tissue remodeling. This may mean being delivered with additional vitamins or going through a process called hydrolysis, as collagen does.

Collagen Peptides: Proven Bioavailability and Bioactivity

Scientific data has confirmed that Peptan® Collagen Peptides enter the bloodstream as soon as a half hour after ingestion, and blood levels of hydroxyproline (a characteristic amino acid indicating collagen production) peak between one-half and one full hour after ingestion.[1]

Peptan® Collagen Peptides are Activated by Hydrolysis

Collagen is naturally a very large molecule. In its natural form, it must be broken down by the digestive system into its usable components. Peptan® collagen goes through a process called hydrolysis, which breaks the larger collagen molecule apart into smaller molecules or peptides. Rather than being broken down by digestive enzymes, collagen peptides are ready to use immediately.[1] These peptides are already in their active form when ingested, so more of the amino acids (protein fragments) from collagen can cross into the blood for tissue remodeling.



This means that you can consume 10g of natural collagen and 10g of collagen peptides, and the collagen peptides will result in a higher production of collagen inside the body than consuming the same amount of natural collagen.

Our Collagen Peptides are Small Molecules

For collagen peptides to cross into the blood, they must pass through the wall of the digestive tract, called the intestinal lumen. Smaller molecules can passively diffuse through the intestinal wall more easily than larger molecules. Peptan® Collagen Peptides have an average size of 2000 daltons, which is small enough to cross the intestinal barrier easily. Daltons are a mass measurement, with one dalton equaling the mass of 1/12 of a carbon atom.

Comparison of Bioavailability Between Collagen Peptides and Other Protein Sources

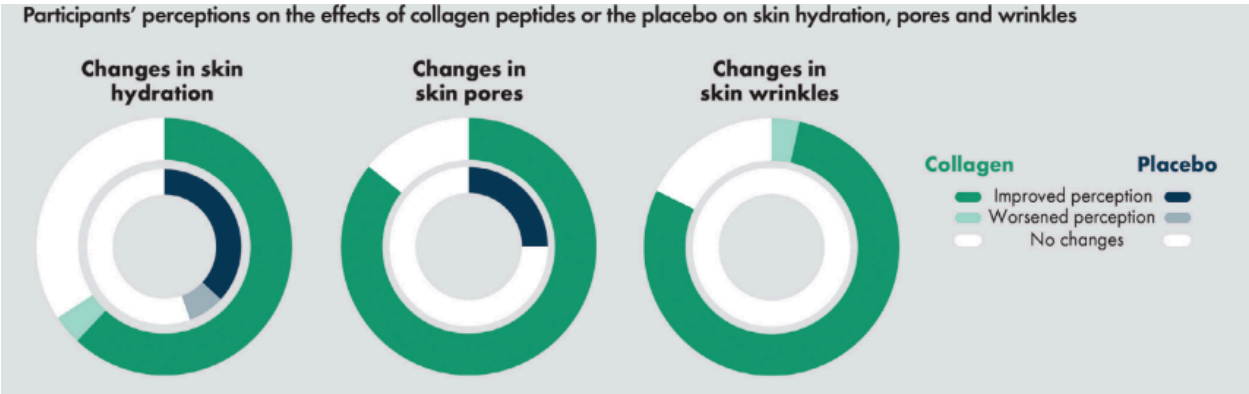
Collagen and other protein sources, such as whey protein, are about equally biologically available. It is easy for your body to take the amino acids from these proteins and incorporate them into your own tissues. The target tissues are the key difference between these two protein

types. Amino acids derived from collagen or whey must be arranged in a certain order to assemble a protein. The amino acids in collagen are assembled in a way best used for connective tissue, whereas whey protein's amino acid profile is better suited to repair muscle tissue.

What are the benefits of High Bioavailability of Peptan®?

1. Skin Health and Anti-Aging

Collagen is a major structural component that underlies your skin, holding it up and strengthening its barrier. As we age, the collagen under the skin degrades, giving rise to wrinkles, impaired hydration, and poor barrier function. Peptan® collagen peptides have been shown to break down into tripeptides in the blood, molecules that are small enough to pass into the skin from the blood. Supplementing with collagen peptides helps support the health of your skin, improving structure and barrier function, decreasing the appearance of wrinkles, and boosting hydration for a healthy glow.[6]



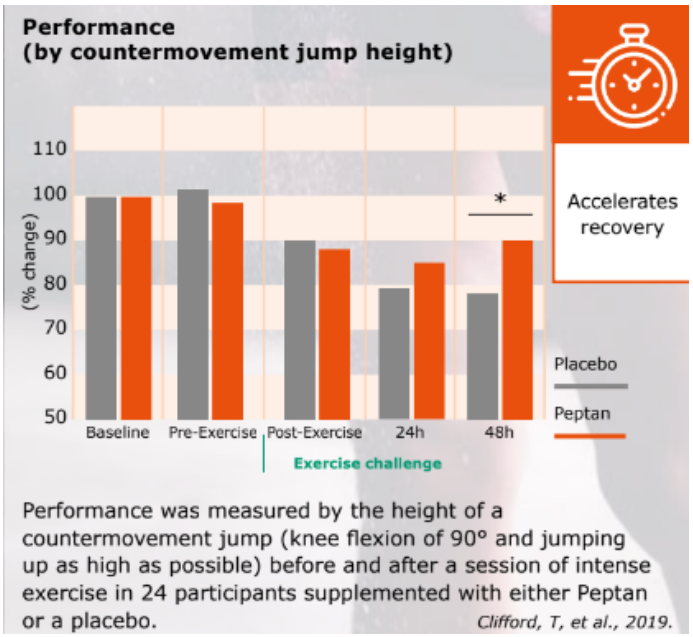
2. Joint and Bone Health

Collagen peptides have been shown to increase the cross-sectional area and density of connective tissue when supplemented regularly.[3] This means you will experience improvements in both joint mobility and joint comfort by supplementing with collagen.

Collagen also increases the density of bones, as measured by X-rays.[2] This can offset the age-related loss of bone density, called osteopenia. Collagen is a flexible part of your bone's framework, making bones more resilient to injury with the ability to flex. This decreases the brittleness of bones, resulting in fewer fractures when placed under mechanical stress.

Muscular Strength and Sports Performance

Collagen helps with muscular strength and mass in a unique way compared to other protein supplements. While dietary protein and other protein supplements help repair muscle tissue after it is damaged from strength training, collagen instead increases the presence of cross-linking proteins between muscle strands.[4] Increased cross-linking gives a more effective and unified muscular contraction, driving increases in strength in a unique manner compared to other protein sources.



Since collagen increases the cross-sectional area of your tendons and ligaments, it decreases the mechanical load on your muscles. Thicker tendons have more tensile strength, just like thicker springs. In tests where athletes had to perform repeated jumps, the group that had been supplementing with collagen was able to produce consistently higher jumps on repeat tests, with lower exertion scores.[5] This underscores the ability of collagen to improve limb force production and sports performance endurance, as well as speed the recovery of your muscles after exercise, decreasing soreness. Taking collagen daily can also help you hit your daily protein consumption goals for efficient muscle building.

Absorption and Utilization of Collagen Peptides in the Body

You may be asking, how do we know that the collagen we supplement with is actually increasing the collagen production or content of particular tissues? There are a few ways we know that collagen peptides are making a change within the body.

1. Key Blood Markers of Collagen Production Are Increased[1]

2. Tissue Density Increase is Seen in Medical Imaging[2,3,4]

3. Wrinkle Measurement Scores Used by Dermatologists Improve[6]

4. Athletic Performance and Subjective Soreness is Improved[5]

Factors Enhancing the Bioavailability of Collagen Peptides

Collagen is highly bioavailable on its own, but we can boost its bioactivity and subsequent tissue remodeling in a few ways.

Supplementation with Additional Nutrients

Studies show that concurrent supplementation with nutrients like zinc, copper, and vitamin C can boost collagen production in conjunction with collagen peptides. These nutrients can help the body to incorporate the collagen from the bloodstream into the body's tissues, so ensuring you have enough of those nutrients can support the bioactivity of collagen.

The most well-supported supplement to take alongside collagen is vitamin C. Studies show that 20g of vitamin C taken with 5-15g of collagen peptides increases the presence of blood-borne markers that indicate collagen production.[5]

Stimulus

Your body prioritizes collagen production based on need. Since we know that strength training improves bone density, we also know that it increases the collagen content of bone and its other components. Presenting your body with a stimulus to increase collagen content in bone or muscle, like strength training, leads to more allocation of collagen to these tissues.

Using Collagen With Other Active Ingredients

For the skin, using a retinol product,[8] stimulating your skin with red light,[9] or applying hyaluronic acid while supplementing with collagen[10] will increase collagen production and allocation in the skin's matrix more than just taking collagen alone. Since these therapies work from the outside in, they perfectly complement collagen peptide supplementation, which works from the inside out.

Summary of the Importance of Bioavailability in Collagen Peptides

Collagen peptides have emerged as a powerful, scientifically backed, and efficient supplement, offering a range of health benefits due to their high bioavailability and bioactivity. By undergoing hydrolysis, these peptides become readily absorbable, allowing them to effectively contribute to collagen production in the body. This enhanced production improves skin health, strengthens joints and bones, and boosts muscular strength and sports performance.

The use of collagen peptides in conjunction with specific nutrients like vitamin C and in response to physical stimuli like strength training further optimizes its effectiveness. Considering all of this, collagen peptides stand out as a valuable addition to anyone's dietary regimen, offering a targeted approach to maintaining and enhancing overall health and well-being.

Frequently Asked Questions

Why is bioavailability important for collagen supplements?

The bioavailability of a supplement determines how easily it can be absorbed and used by your body.

How are collagen peptides absorbed and utilized in the body?

Collagen peptides cross the digestive barrier into the blood and cause remodeling of tissues by providing raw materials and boosting the body's own collagen production.

What factors influence the bioavailability of collagen peptides?

The size and chemical structure of collagen peptides are two factors that influence how well it is absorbed in the body.

How does the bioavailability of collagen peptides compare to other protein sources?

Collagen and Whey proteins have similar bioavailabilities but are used by the body in different ways.

Are there specific types of collagen peptides that are more bioavailable?

Collagen peptides are more bioavailable than naturally occurring collagen, found in foods like gelatin or bone broth. The smallest possible collagen peptide is the tripeptide, which is its most bioactive form.

What are the primary health benefits of highly bioavailable collagen peptides?

Improved joint comfort, strength, and function, healthier skin, hair, and nail, improved gut barrier function, and heightened sports performance and recovery. It also helps you hit your protein intake goals!

Can the body fully absorb collagen peptides taken as supplements?

Yes, this is one of the easiest ways to get collagen's amino acids into the bloodstream.

Do factors like age or health conditions affect the absorption of collagen peptides?

No, collagen peptides are efficiently broken down into amino acids before ingestion and absorbed in the small intestine, a process not significantly influenced by age or most health conditions.

How quickly can one expect to see benefits from taking collagen peptides?

You can see and feel the differences from taking collagen as soon as 90 days.

Is there a recommended dosage for collagen peptides to ensure optimal bioavailability?

Peptan® Collagen Peptides are most effective at a recommended dose of 10g daily.

How does the bioavailability of collagen peptides impact skin, joint, and bone health?

The exceptional bioavailability of collagen peptides positively affects the structure of your bones and connective tissue, improving joint comfort and function. It also reinforces the structural integrity of the skin, improving its appearance.

Is collagen safe for everyone?

It is possible to experience intolerance to collagen, manifesting as a rash or digestive upset, but there are no other adverse reactions to collagen reported.[7] It's always a good idea to speak with your healthcare provider before adding a new supplement to your regimen, especially if you have allergies or underlying medical conditions

Are collagen peptides safe and effective for long-term use, considering their bioavailability?

Yes! As long as you react well to collagen initially, it is safe to use long-term.

References

1. Kleinnijenhuis, A.J., 2019. Non-targeted and targeted analysis of collagen hydrolysates during the course of digestion and absorption. Anal Bioanal Chem. 2019 Dec 24. doi: 10.1007/s00216-019-02323-x.
2. Wauquier F. et al., 2019, Human enriched serum following hydrolyzed collagen absorption modulates bone cell activity: from bedside to bench and vice versa, Nutrients, 2019, vol. 11, no. 6, pg. 1249.
3. Jerger S., Centner C., Lauber B., Seynnes O., Sohnius T., Jendricke P., et al. (2022). Effects of specific collagen peptide supplementation combined with resistance training on Achilles tendon properties. Scand. J. Med. Sci. Sports 32, 1131–1141. doi:10.1111/sms.14164
4. Haus JM, Carrithers JA, Trappe SW, Trappe TA. Collagen, cross-linking, and advanced glycation end products in aging human skeletal muscle. J Appl Physiol (1985) 103: 2068–2076, 2007. doi:10.1152/japplphysiol.00670.2007.
5. Lis DM, Jordan M, Lipuma T, Smith T, Schaal K, Baar K. Collagen and vitamin C supplementation increases lower limb rate of force development. Int J Sport Nutr Exerc Metab. 2021; 32: 65-73.
6. Borumand, M. et al., 2014, Daily consumption of the collagen supplement Pure Gold Collagen® reduces visible signs of aging, Clinical Interventions in Aging. 9:1747-1758

7. Al Bahri ZA, Al Ali AA, Al-Azri ARS, Al Balushi AA, Al Hinai MH, Al Busaidi KN. Dietary Collagen Supplements Might Not Be Completely Innocent: A Case of Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis Overlap Induced by a Collagen Supplement. Indian J Dermatol. 2022 Mar-Apr;67(2):178-179. doi: 10.4103/ijd.ijd_752_21.
8. Zasada M, Budzisz E. Retinoids: active molecules influencing skin structure formation in cosmetic and dermatological treatments. Postepy Dermatol Alergol. 2019 Aug;36(4):392-397. doi: 10.5114/ada.2019.87443.
9. Li WH, Seo I, Kim B, Fassih A, Southall MD, Parsa R. Low-level red plus near infrared lights combination induces expressions of collagen and elastin in human skin in vitro. Int J Cosmet Sci. 2021 Jun;43(3):311-320. doi: 10.1111/ics.12698.
10. Wang F, Garza LA, Kang S, Varani J, Orringer JS, Fisher GJ, Voorhees JJ. In vivo stimulation of de novo collagen production caused by cross-linked hyaluronic acid dermal filler injections in photodamaged human skin. Arch Dermatol. 2007 Feb;143(2):155-63. doi: 10.1001/archderm.143.2.155.