

## WHAT IS COLLAGEN PEPTIDE

Collagen is the protein in our body which is the main component of connective tissue. It makes up approximately 30% of the body's protein which can be found in the skin, bones, cartilages and tendons. When we start to age, our collagen production slows down which affects the skin's hydration, suppleness and elasticity. Beyond the skin, our connective tissues also start to deteriorate and weaken which leads to various ailments. Collagen is a vital component in keeping ourselves healthy and young.

## SIGNIFICANCE OF OUR COLLAGEN

Collagen is a revolutionary product that not only supplements the collagen need of our body, but also helps our body to produce it naturally. Collagen provides multidimensional benefits for skin, bone and joint health by regenerating the cells needed for maintaining an active lifestyle and enhanced immunity, health, strength and elasticity throughout the body.

Collagen Peptide is a high-quality bio peptide Marine Collagen which is also known as "Super Collagen" because this is the form of collagen that our body can best absorb. This is so because of the process of "HYDROLYZATION" which reduces the molecular size of the collagen and increases the intestinal absorption of the product. It has been clinically tested in Japan that the use of hydrolyzed collagen improves skin suppleness, hydration and elasticity which allows its users to look younger and be healthier.



**No Additives**  
**No Preservatives**  
**No Artificial Ingredients**  
**No Fat**  
**No GMO**  
**No Pesticides**  
**Lactose and Gluten Free**



# COLLAGEN POWDER

## Skin, Health and Beauty

### Explanation of Ingredients

**Collagen** is a fibrous protein originally present in the body, which in combination with hyaluronic acid, is a strong element for keeping moisturized and smooth skin. Collagen is a natural substance in our body which decreases with age. Moreover, collagen is a key element in the health of joints, cartilage, tendons, bones and all connective human tissue.



Skin



UV & UVB Protection



Collagen Peptide



Immunity



Joint & Cartilage

### Benefits

- > Health & Beauty supplement that can be easily mixed with any food or drink as part of any diet or meal
- > Natural skincare & anti-aging
- > Support of health of joints for men and women regardless of their active or passive lifestyle
- > Odourless, tasteless and completely natural.

### Recommended for people who:

- > Want a quick boost of health & beauty in their daily lifestyle
- > Want to keep moisturized skin
- > Feel tired and want to look their best
- > Do not get enough exercise or want to supplement their exercise routine with a supplement to strengthen joints
- > May not get enough intake of daily protein.

### Details

- > Presentation: Aluminum foil stick with Box
- > Packaging: 30 sticks per box
- > Suggested Intake: 1 or 2 sticks per day
- > Type: Food supplement.

### Ingredients

- > 100 % Pure Collagen Peptide (Fish).

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## **COLLAGEN – Peptide** **Japanese Beauty & Health Secret**

Collagen provides multidimensional benefits for skin, bone and joint health by regenerating the cells needed for maintaining an active lifestyle and enhanced immunity, health, strength and elasticity throughout the body. Collagen peptide is a high-quality, clinically tested, bio peptide. Marine Collagen is easy to digest and quickly absorbed due to its low molecular weight and high bioavailability. Classified as a food supplement, it is widely consumed in Japan by all age-groups especially those who look after their overall wellness, health and appearance

### **SKIN HEALTH**

**Collagen helps to promote healthy, radiant skin by nourishing our body with the nutritional building blocks required to improve skin structure.**

Skin Health is affected by age and external factors. Collagen is one of the most important structural substances in our bodies, accounting for 25 to 30% of its total protein – 75% of our skin is collagen. It is the key component for supple and radiant healthy skin.

As we age, our body loses its ability to make collagen, causing it to break down. Loss of collagen leads to a collapsing dermal layer and this contributes to wrinkles and loss of elasticity. The environment also affects our skin and UVA/UVB exposure induces skin damage and loss of collagen. Everyone can benefit from taking collagen and maintaining the integrity of the extracellular matrix is essential for a youthful skin appearance.



### **Collagen benefits on skin health**

Collagen is a bioactive ingredient that improves skin properties to achieve an optimal skin condition. Our product slows down the aging process by nourishing the body with the nutritional building blocks it needs. In particular, Marine Collagen contains much larger amounts of the amino acids, glycine, proline and hydroxyproline than many other proteins. These amino acids are necessary for promoting healthy tissue growth by the



cells themselves. Collagen also highly digestible and is characterized by an improved bioavailability for optimal results on the skin. Collagen embraces the benefits of “beauty from within”. Comprehensive clinical studies have been carried out, highlighting the numerous positive effects of ingesting collagen.

## JOINTS HEALTH

**Collagen promotes joint health by helping to repair joint matrix degeneration and improving long term joint comfort and mobility.**

**Osteoarthritis - most common joint disorder is on the rise.** Joint Health is affected by age and external factors causing osteoarthritis, also known as degenerative joint disease, and is the most common joint disorder. This form of arthritis can be developed with age but external factors can also affect joints, such as mechanical stress due to intense sport activities. Osteoarthritis is linked to the breakdown of cartilage, exclusively made of chondrocytes cells.

These cells produce and maintain the articular matrix, consisting mainly of collagen. An insufficient amount of collagen results in the loss of cartilage. Without the normal amount of cartilage, the bones rub together, causing pain, inflammation and stiffness. Any movement can be extremely painful and mobility becomes limited.



### Collagen benefits on Joint Health :

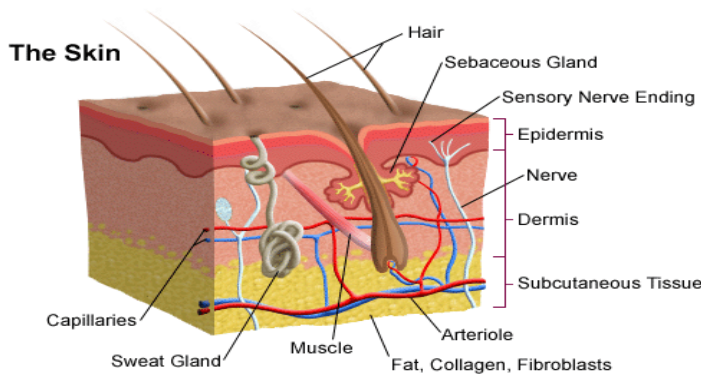
Collagen is a bioactive ingredient that promotes joint health by helping to repair joint matrix degeneration and improving long-term joint comfort and mobility.

Studies have shown that ingestion of collagen peptides directly improves joint mobility, comfort and reduces joint pain. These collagen peptides are accumulated in cartilage and help to repair joint matrix degeneration by stimulating chondrocytes cells for the biosynthesis of collagen.

## BONES, HAIR, NAIL HEALTH

Research has shown Collagen helps to restore bone mineral density and support healthy bone metabolism. It also supports hair and nail health.

**Bone Health is affected by age.** As worldwide population is rapidly aging, bone health problems are consistently increasing, causing pain and discomfort. In the elderly particularly, the amount of daily intake of protein can be sub optimal and can contribute to osteoporosis, a condition where the bone mineral density is low and is associated with increasing risks of fracture.



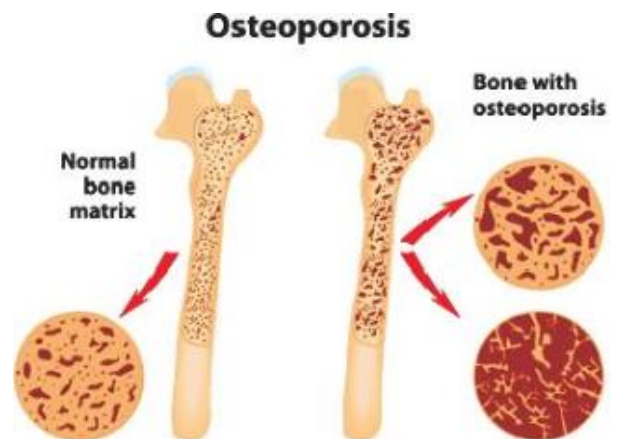
Molecular biologists have identified collagen as the key structural protein can help you get thicker hair and nails from the inside out.

Type I collagen represents 90% of organic bone mass. All bones consist of living and dead cells embedded in the extra-cellular matrix that makes up the skeleton. While bone is essentially brittle, it does have a significant degree of elasticity, contributed chiefly by collagen.

### Collagen benefits on Bone Health:

Collagen has numerous beneficial effects. Collagen peptides help to maintain bone health and restore bone mineral density in order to prevent the risk of osteoporosis. Every-one can benefit from taking collagen to preserve bone health and for an improved quality of life.

In vivo animal studies conducted to investigate the effects of Collagen under a low protein diet reported that ingesting collagen daily increases considerably bone mass density. Research has shown that these peptides molecules induce the differentiation of cells into osteoblasts.



## Benefits

- Health & Beauty supplement
- Natural skin care & anti-aging
- Improvement of skin smoothness
- Improvement of skin suppleness and viscoelastic properties
- Increase in the water absorbing capacity of the stratum corneum
- Reduction of fine lines and deep –wrinkles formation
- Reduction of UVB induced skin damage
- Help to repair joint matrix degeneration
- Improves joint health by strengthening cartilage and joint structure
- Enhance joint comfort and mobility to reduce join pain
- Scientifically proven
- Restoring Bone Mineral Density
- Reducing the bone reabsorption and stimulating bone formation
- Increases bone strength and reducing the risk of fracture.

**Recommended  
For**

- Want a quick boost of health & beauty in the daily lifestyle
- May not get enough intake of protein
- Feel tired and want to look their best
- People who have no time for Skincare
- Do not get exercise or want to supplement their exercise routine with a supplement to strengthen joints
- People who spend money on various types of cosmetics. The Collagen Peptide has many functions and can save money
- People with sensitive and dry skin
- People suffering from acne
- Concern about their beauty and health and want to keep a moisturized skin.



Ingredients

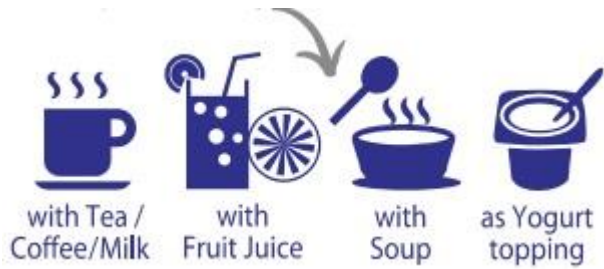
Active Ingredients	Explanation of Main Ingredients
<p>100 % Pure Marine Collagen Peptide</p>	<p><b>Marine Collagen Peptide:</b> is a high-quality bio peptide Marine Collagen which is also known as "Super Collagen" because this is the form of collagen that our body can best absorb. This is so because of the process of "HYDROLYZATION" which reduces the molecular size of the collagen and increases the intestinal absorption of the product. It has been clinically tested in Japan that the use of hydrolyzed collagen improves skin suppleness, hydration and elasticity which allows its users to look younger and be healthier.</p> <p>Our product is highly refined at the level of 100 % purity, with no other ingredient other than protein-derived collagen are added. The product contains no additives, no conservatives, no flavouring substances, no fats, no sweeteners nor any artificial substance whatsoever. Finally, our product does not use any raw material that falls under the Genetically Modified Organisms.</p>

**OEM Details**

<b>OEM</b>	<b>DETAILS</b>
<b>Packaging</b>	<b>Bulk ( 10 kg)</b>
<b>Ideal MOQ</b>	100 kg
<b>Price</b>	On request
<b>Ideal qty. for Sample Order</b>	50 gms
<b>Samples</b>	Available
<b>Standard Certificates</b>	Manufacturing Declaration Certificate, ISO, Flow Chart, Packaging details, COA, COO, Free Sale of Certificate.
<b>Type</b>	Powder
<b>Brand</b>	OEM / Private Label
<b>Shelf Life</b>	36 Months
<b>Origin</b>	Made In Japan
<b>Packaging</b>	<b>3 grams per stick</b>
<b>Ideal MOQ</b>	30,000 sticks
<b>Price</b>	On request
<b>Ideal qty. for Sample Order</b>	50 gms
<b>Standard Retail Pack</b>	30 sticks per box
<b>Samples</b>	Available
<b>Standard Certificates</b>	Manufacturing Declaration Certificate, ISO, Flow Chart, Packaging details, COA, COO, Free Sale of Certificate
<b>Type</b>	Powder
<b>Brand</b>	OEM / Private Label
<b>Shelf Life</b>	36 Months
<b>Origin</b>	Made In Japan
<b>Packaging</b>	<b>5 grams per stick</b>
<b>Ideal MOQ</b>	20,000 sticks
<b>Price</b>	On request
<b>Standard Retail Pack</b>	30 sticks per box
<b>Samples</b>	Available
<b>Standard Certificates</b>	Manufacturing Declaration certificate, ISO, Flow Chart, Packaging details, COA, COO, Free Sale of Certificate.
<b>Type</b>	Powder
<b>Brand</b>	OEM / Private Label
<b>Shelf Life</b>	36 Months
<b>Origin</b>	Made In Japan
<b>Packaging Options available</b>	100 gms, 500 gms

## How to Use

- A raw material for beauty cosmetics such as moisturizing or anti-aging creams, etc.
- Directly as a **finished-product! Easy to mix**



- To fortify food supplements, wellness foods, health drinks, tablets
- For ingestible beauty products, anti-aging, skin-care products
- Bones & knee joint formulations (Arthritis, Osteoporosis supplements)
- Muscle development, Protein & Diet supplements

**Pictures**

<b>Products Image</b>	<b>Products Packaging Details</b>
	<p>Private Label for 3gm / 5gm / 10gm</p>
	<p>Private Label for 100grams / 500grams</p>
	<p>Bulk 10 Kg</p>

## **FAQ's regarding Collagen**

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### **1) What is collagen peptide made of?**

Collagen is processed from animal-derived raw materials: Fish scale and skin, swine or bovine hide or bone. From a regulatory perspective, it is generally considered a food ingredient or a dietary supplement.

### **2) From where your collagen peptide is derived?**

Our fish collagen peptide is derived from fresh water\deep sea water.

### **3) Are there clinical efficacy studies of collagen?**

Yes, clinical studies are available regarding efficacy of collagen.

### **4) What about certificates on quality and manufacturing?**

Collagen peptide is qualified under the "food" category under Japan regulations. In addition, the products are manufactured following ISO ( 9001- 2000 ) standards. Some plants also manufacture pharmaceutical products, and in those cases, they have Japan GMP category (issued by the Japan Ministry of Health, Labor and Welfare). This means that we can supply collagen made under Japanese pharmaceutical industry standards. Moreover, the product MSDS is also available for countries who require this documents.

### **5) Is collagen safe?**

Yes. It is a natural supplement derived from natural ingredients, from the careful selection of raw materials through the entire manufacturing process in GMP and Japanese Ministry of Health approved facilities. Collagen has been long used all over the world in foods and medicines and clinical studies have indicated limited cases of fullness or unpleasant taste at the most, without adverse effects being noted. Most of the European makers set shelf life as 5 years from manufacturing. In our case, the usual expiry date is 3 years. We establish a shorter expiry date to guarantee the quality of the product during the entire cycle in a stricter standard than other market

### **6) What is the best application for collagen peptide?**

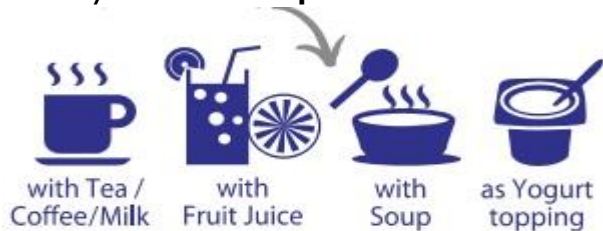
It depends upon your intended application (food, cosmetics, beverages, industrial, etc ) and then assist depending on the particular case. Collagen is a highly versatile product!

## FAQ's regarding Collagen ( Contd. )

### 7) Can collagen peptide be directly applied on the face or body (not through the digestive system or an injection ) and be properly absorbed ?

As a consumer product, the application of collagen peptide is generally understood as:

- a. A raw material for beauty cosmetics such as moisturizing or anti-aging creams, etc.
- b. Directly as a **finished-product!**



**Or** as an ingredient :

- To fortify food supplements, wellness foods, health drinks, tablets
- For Ingestible Beauty products, Anti-aging, Skin-care products
- Bones & knee joint formulations (Arthritis, Osteoporosis supplements)
- Muscle development, protein & diet supplements

We cannot warrant the use of collagen peptide through other means.

### 8) Can I take collagen if is already taking other supplements?

Our collagen is a totally natural supplement derived from fish without preservatives or conservatives. As Such there is no particular counter-indication about collagen because it should be regarded as a Food supplement only. Having said the above however, we always encourage our customers to advise consumers to consult their doctors at all times and that collagen should not be understood as a replacement of any nutritious diet nor exercise routine to maintain good health and beauty.

### 9) What is hydrolyzed collagen?

“Collagen” is the common name of the protein sub-type and “Gelatin” is regularly used as the name of the product industrially manufactured. At its time, “Collagen Peptide” is equivalent to “hydrolyzed collagen (gelatin)”. In general, when we refer to “Collagen” in health foods, we mainly refer to collagen peptide.

### 10) Does heat (or cold) affect the efficacy of collagen

No, the heating of the collagen peptide does not affect its efficacy. Same applies for low temperatures even to a frozen level.

## **FAQ's regarding Collagen ( Contd. )**

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### **11) How refined is your collagen?**

Our product is highly refined to a level of 100% purity, where no other ingredients other than protein- derived collagen are added. The product contains no additives, no conservatives, no flavouring substances, no fats, no sweeteners nor any artificial substance whatsoever. Finally, our product does not use any raw material that falls under the Genetically Modified Organisms (GMO) category.

### **12) Can collagen peptide be absorbed directly through mist without the collagen molecule being degraded or damaged ?**

Collagen peptide does not evaporate through heating. We do not have evidence to say that Collagen peptide can be absorbed in the skin by means of evaporation.

### **13) Why Japanese collagen may be more expensive than Korean or Chinese collagen?**

Japan has the highest standards of quality and technology in the collagen market. Manufacturing practices in Japan are extremely strict and inspection, controls and confirmations are internally demanded numerous times. Our philosophy is “cost is important, but safety, quality and effectiveness are more critical”. We aim at providing the safest product and our customers can have the confidence that they are getting what they pay for: Pure collagen peptide.

### **14) How about European collagen?**

Europe also has a tradition of collagen. However, Japanese cosmetic/food/healthcare manufacturers demand extreme quality and therefore, the demand for Japanese collagen peptide is much higher than European collagen in Japan. Our collagen peptide is used mostly by Japanese manufacturers due to this reason and more over about 70% of collagen market in Japan is dominated by Japanese collagen manufacturers out of which our collagen has 40% share in comparison with European collagen which has 10% due to very strict quality requirements demanded by Japanese factories including large differences in solubility.

### **15) How about raw materials?**

Regarding raw materials, we carefully track the materials from factories which have HACCP certifications only, while using the same fish type in order to be able to track the raw materials in all cases. This is the Japanese standard.

### **16) Is there indication for cases of pregnant and breastfeeding women?**

Collagen is naturally present in our body and consumed daily with our meals. Therefore, this product is usually classified as “foodstuff” or “food supplement” under most countries' laws.

## **FAQ's regarding Collagen ( Contd. )**

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As Collagen is essentially a “food”, there is no “medical” indication applicable to it as a principle. However, responsible manufacturers always recommend that in case of doubt, the consumer should consult the doctor, particularly in case of people with special allergies or in case of discomfort.

**17) Do you have any testing report and data proven for skin test that is suitable for all kinds of skin even the sensitive and wound skin?**

According to existing data, there is no contraindication for the use of collagen. Reason: Collagen is a food supplement. As long as a person does not have a special condition that prevents him/her from eating animal derived foods.

**18) Is there any recommendable age to consume collagen?**

Not as a principle. Collagen benefits all people equally for the reasons as explained here: It is a naturally occurring element in our body that is key for maintaining firm and beautiful skin. However, it is obviously recommended for adults.

**19) Does collagen help suppressing the effects of skin damage caused by UV?**

According to latest research, collagen helps suppressing the effects of skin damage caused by the sun. This was based in a double blind placebo trial where 5gr of collagen peptide were ingested during four weeks. The test was effectuated over the skin of Japanese adult males between the ages of 20 to 59 years old.

**20) Does collagen produce fat?**

No.

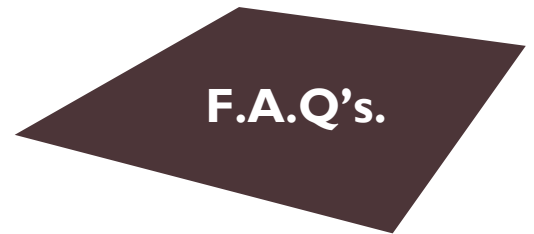
**21) I am going through an exercise routine. Will collagen help my dietary efforts?**

Yes, collagen as a natural protein has direct relation with muscle development: The more muscle, the higher the metabolism, and the lower the fat. Collagen supports a virtuous cycle of fat loss by supporting the development of muscle tissue.

**22) What is the usual expiry date?**

3 years after manufacturing is the standard.





## FAQ's regarding Collagen ( Contd. )

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### 23) What can you tell about the absorbability level?

It is a commonly understood fact that the absorbency of protein is approximately 90%. As collagen peptide is a form of protein, it is derived that collagen protein absorbency rate is on or above 90% depending on the grade. Although scientific evidence is not completely conclusive, collagen products are regularly marketed in accordance with the above concept.

### 24) Is there a difference in the quality/efficacy depending on the “molecular size” of the collagen?

Although we count with a diverse molecular weight line-up (3,000-5,000 / 2,000 / 1,000 etc.), in general the average molecular size of the collagen peptide is between 3,000 to 5,000 Dalton. Reason is because we strive to keep a final product that balances efficacy with taste/odour.

- a) Taste/Odour: The smaller molecular weight, the higher bitterness of the end product because reduction of molecular size requires a manufacturing process that results in the existence of higher amounts of amino acids. Amino acids result in more bitterness of the final product. Moreover, solubility is also affected in case of smaller molecular weight.
- b) Efficacy: According to research made in Japan, there is no conclusive scientific evidence that indicates lower efficacy within certain range of molecular weight. In the reference section of this brochure, all the scientific studies performed in Japan were made using collagen peptide of an average dalton of 3,000. Scientific evidence concludes that any range between 3,000 to 5,000 dalton is suitable in terms of absorption by the human body. The end result is: Japanese collagen peptide is of a whiter colour, higher efficacy, much more soluble and no smell/taste when you try it!

### 25) Do you have tri-peptide collagen?

Yes. This type of collagen has higher and faster absorbability. Hence, this type of collagen peptide is mostly recommended for consumption early in the morning, as opposed with the standard types of collagen that have better efficacy if consumed before sleep (standard absorption assures supply of collagen during long hours of fasting like when we are asleep )

In terms of molecular size, it is around 200 to 300 dalton, which makes it very efficient. However, In terms of cost is quite higher than other types of peptide and taste-wise it is slightly bitter due the fact that the particles are much smaller than the standard types. Tri-peptide content in our collagen is 15%.



Gelatin has long been used in both foods and medicine. Collagen peptide which is made by decomposing gelatin with proteinase, is now increasingly being used as a supplement. Here, we briefly review studies, including our own, on the effects of ingesting collagen peptide.

## 1) Collagen, gelatin and collagen peptide

"Collagen" is the most abundant protein in our Body, comprising about one third of total protein. The molecular size of collagen is 300 kDa, as collagen is composed of three polypeptide chains, each of which is 100 kDa. "Gelatin" is made industrially by extracting heat denatured collagen from bone or skin in boiling water. The three polypeptide chains of the collagen molecule are dissociated by heating, and hydrolysis of each polypeptide chain occurs. Therefore, the molecular size of gelatin is 100k Da or less, although considerable variations in size are observed. Gelatin is soluble in hot water but forms a gel when dissolved in cold water.

"Collagen peptide" is prepared by decomposing gelatin into smaller sizes using proteinase. Collagen peptide does not form a gel and readily dissolves in cold water, even at relatively high concentrations. Thus collagen peptide is easier to ingest in large amounts than native collagen or gelatin. The molecular size of collagen peptide varies widely (0.3~8 kDa) depending on the method and conditions of decomposition. Although native collagen, gelatin and collagen peptide each represent different forms of the collagen molecule, they are often collectively referred to as 'collagen' when used in supplements, cosmetics or food.

**2) Effects on bone**

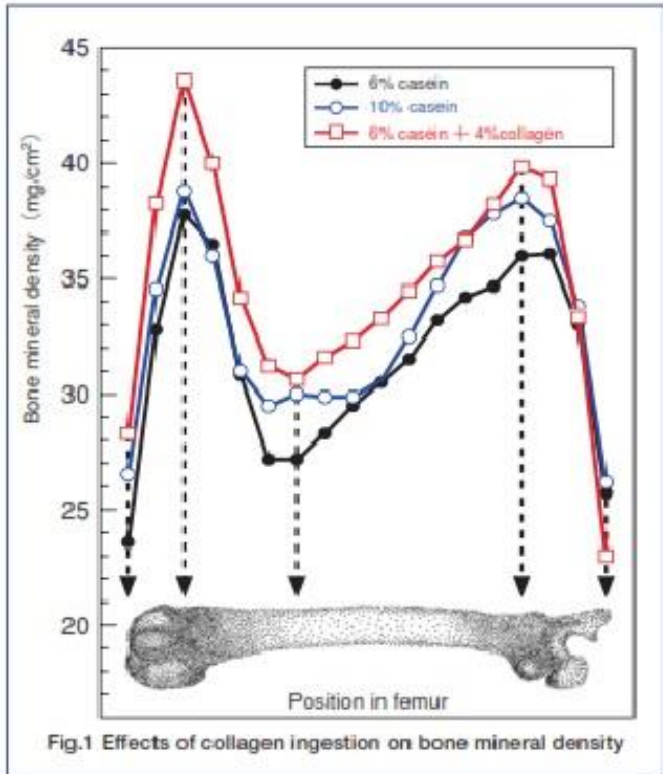


Fig.1 Effects of collagen ingestion on bone mineral density

If the amount of daily intake of protein is low, bone mineral density decreases. Low protein conditions may be a cause of lower bone mineral density in the elderly. We performed an animal experiment to investigate the effects of collagen ingestion on low protein conditions (1). When mice are given food containing 10% casein, bone mineral density becomes significantly lower when compared to mice given food containing 14%. Figure 1 shows bone mineral density of mice raised for 10 weeks with food containing 6% casein, 10% casein or 6% casein + 4% collagen. The horizontal axis shows the position in the femur, while the vertical axis indicates the bone mineral density at that position. Bone mineral density in the mice given food containing 6% casein + 4% collagen was significantly higher when compared to mice given 10% casein. It is known that bone mineral density increases with body weight. However, in this study, no significant difference in

body weight was observed. These results thus suggest that collagen is superior to casein in its potential to enhance bone mineral density during protein undernutrition. Wal. (2) Nomura et al. (3) confirmed the beneficial effects of collagen ingestion on bone mineral density and mechanical strength.

**3) Effects on skin**

We carried out a double blind test in order to examine the effects of collagen intake on skin hydration (4). Young female volunteers consumed a drink containing 10 g of collagen or placebo every day for 2 months. Figure 2 shows the increase in water absorbing capacity of the stratum corneum of the skin during the test period. The increase in water absorbing capacity of the collagen-ingesting group (80.2 $\mu$ S) was larger than that of the placebo group (10.8 $\mu$ S) at 1 month, and the difference became larger between the collagen group (203.5 $\mu$ S) and the placebo group (113.7 $\mu$ S) when the test period was extended to 2 months. The increase in the placebo group may be explained by the fact that both the placebo drink and the collagen drink contained vitamin C, which may have improved skin function. Morganti et al. (5) also reported that skin hydration increased when a patient with dry skin ingested collagen.

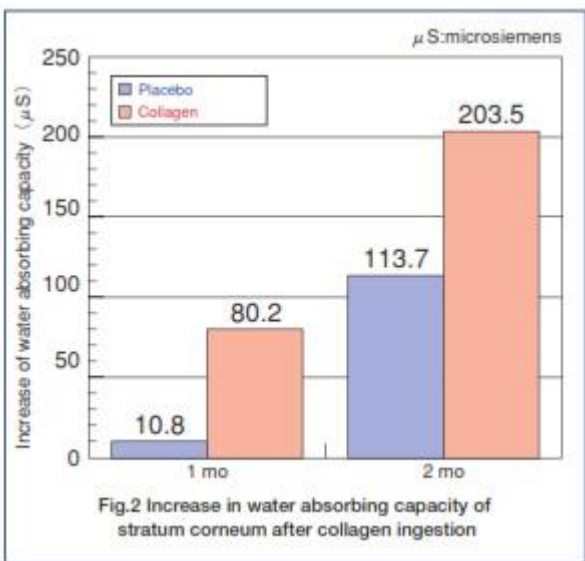
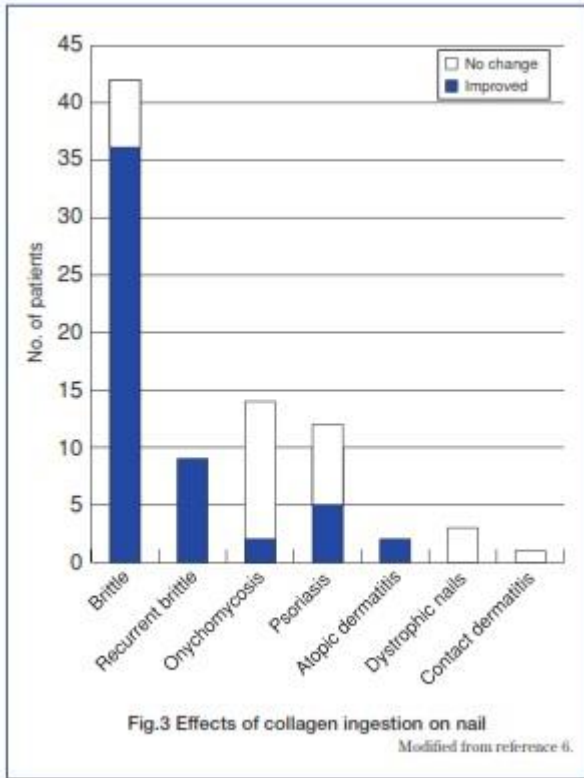


Fig.2 Increase in water absorbing capacity of stratum corneum after collagen ingestion

#### 4) Effects on nail and hair



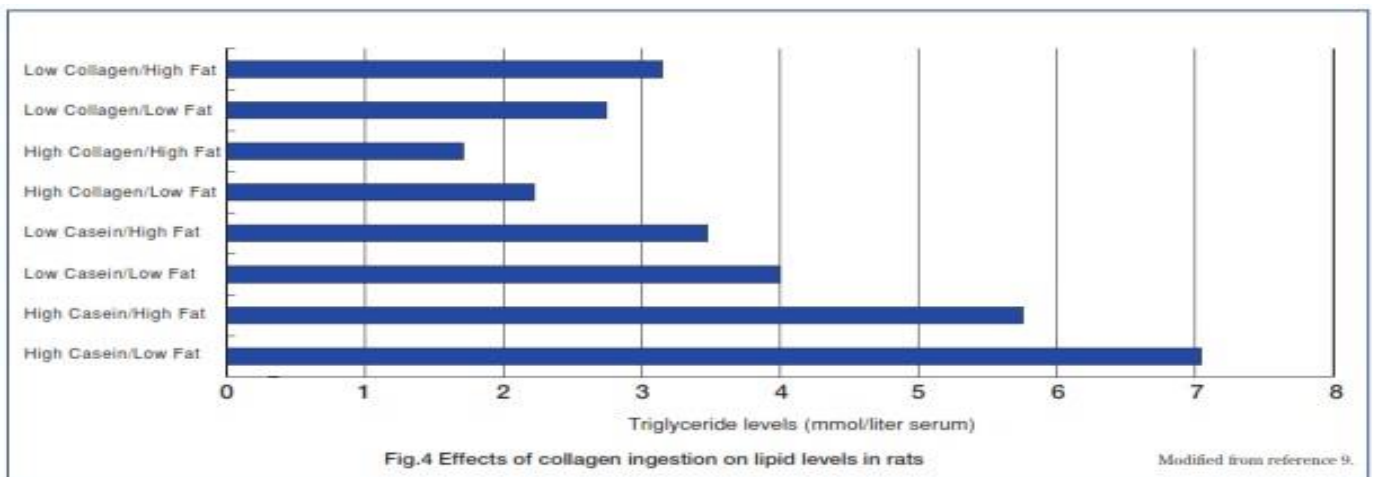
Nail defects are a common complaint among women. Rosenberg et al. (6) showed that ingestion of collagen improved nail defects; they administered 7g of collagen daily and found that nail defects were improved in 43 of 50 patients (86%) (Fig.3). It was also reported that the cessation of collagen ingestion resulted in the reappearance of nail defects. Schwimmer et al. (7) also reported improvements in nail defects in 80% of patients after ingestion of collagen peptide.

The main component of hair is keratin, as is the case for stratum corneum and nails. Scala et al. (8) investigated the effects of collagen ingestion on growth and thickness of hair. They found that the thickness of hair increased significantly after collagen ingestion for 62 days, and more pulling force was required to break the thickened hair. The increase in hair thickness was more evident in women than in men, possibly because the initial thickness was smaller in women. Hair thickness returned to initial size when collagen ingestion stopped.

#### 5) Effects on triglyceride in the blood

High concentrations of triglyceride in the blood cause arteriosclerosis. There are several reports suggesting that ingestion of collagen reduces triglyceride levels in blood. Ratnayake et al. (9) prepared 8 types of food for rats by combining high or low concentrations of collagen and casein with high or low amounts of lipid, as shown in Figure 4. It was found that triglyceride levels in blood decreased when rats were given collagen containing food than casein-containing food. Oliveira et al. (10) and Wu et al. (2) also reported the beneficial

Effects of collagen ingestion in reducing the amount of triglyceride in blood.

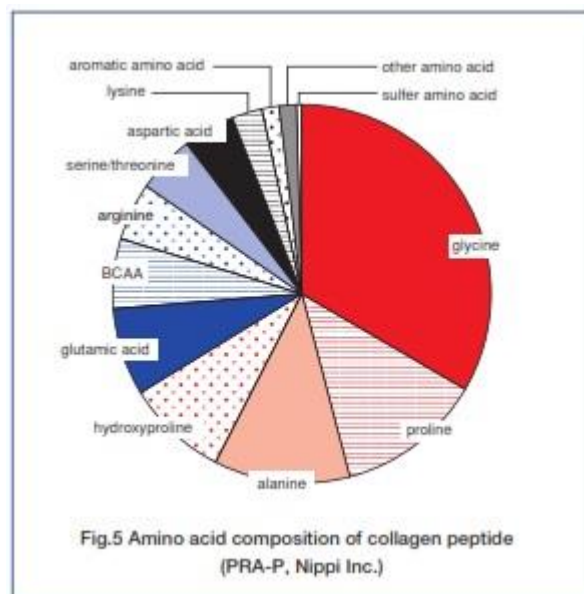


## 6) Ingested collagen as a source of amino acid

Figure 5 shows the amino acid composition of collagen made from porcine hide (PRA-P, Nippi Inc.). The amino acid composition is almost the same as native collagen. About one third of the amino acid in collagen is glycine, as collagen is largely comprised of Gly-X-Y amino acid sequences. Collagen also contains relatively large amounts of proline and hydroxyproline. Glycine is a simple amino acid that plays various roles, including functioning as a neurotransmitter.

Glycine is also a precursor for synthesis of heme and glutathione, as well as proteins, in the body. Although glycine is not an essential amino acid, it is important to consume sufficient amounts on a daily basis. The ratio of branched carbon amino acids (BCAA; valine, leucine, isoleucine) to aromatic amino acids (phenylalanine, tyrosine) is relatively high in collagen. Therefore, collagen is used clinically to improve the amino acid imbalances in liver cirrhosis. Free amino acid has a

unique taste, which may lead to difficulties when added directly to foods. In contrast, collagen is tasteless and odorless, and thus has the least effect on food flavor. The effects of collagen ingestion may be partially explained by the function of amino acids contained in collagen. However, the beneficial effects of collagen ingestion described cannot be explained solely based on the function of free amino acid. A mechanism specific to collagen digestion and absorption is probably involved in the effects of collagen ingestion (11).



## 7) Safety of collagen ingestion

Supplement safety is far more important than effectiveness. Collagen has long been used all over the world in foods and medicine, indicating that collagen is a highly safe material. We carried out biochemical analyses of blood in the human clinical test described above (4), in which 10 g of collagen was taken every day for 2 months. No abnormal changes were observed in any of the 23 items examined.

Moskowiz (12) examined the adverse effects of collagen ingestion (10 g/day) for 24 weeks. In this study, minimal adverse effects, typically gastrointestinal complaints characterized by fullness or unpleasant taste, were observed, but no severe adverse effects were noted. In an animal study, Wu et al. (2) also reported that collagen ingestion provided beneficial effects on bone metabolism without obvious undesirable effects. Thus, ingestion of appropriate amounts of collagen is considered safe.

### References:

- 1) Koyama Y et al., Ingestion of gelatin has differential effect on bone mineral density and body weight in protein undernutrition. *J Nutr Sci Vitaminol* 47:84-86 (2001)
- 2) Wu J et al., Assessment of effectiveness of oral administration of collagen peptide on bone metabolism in growing and mature rats. *J Bone Miner Metab* 22:547-553 (2004)
- 3) Nomura Y et al., Increase in bone mineral density through oral administration of shark gelatin to ovariectomized rats. *Nutrition* 21:1120-1126 (2005)
- 4) Sumida E et al., The effect of oral ingestion of collagen peptide on skin hydration and biochemical data of blood. *J Nutr Food* 7:45-52 (2004)

- 5) Morganti P et al., Oral Treatment of Skin Dryness. Cosmet Toilet 103:77-80 (1988)
  - 6) Rosenberg S et al., Further studies in the use of gelatin in the treatment of brittle nails. Arch Dermat & Syph 76:330-335 (1957)
  - 7) Schwimmer M, Mulinos MG. Salutory effects of gelatin on nail defects in normal subjects. Antibiotic Med Clin Ther 4:403-407 (1957)
  - 8) Scala J et al., Effect of daily gelatine ingestion on human scalp hair. Nutr Rep Int 13:579-592 (1976)
  - 9) Ratnayake WMN et al., Influence of dietary protein and fat on serum lipids and metabolism of essential fatty acids in rats. Br J Nutr 78:459-467 (1997)
  - 10) Oliveira DR et al., Gelatin intake increases the atheroma formation in apoE knock out mice. Atherosclerosis 154:71-77 (2001)
  - 11) Iwai K et al., Identification of food-derived collagen peptides in human blood after oral ingestion of gelatin hydrolysates. J Agric Food Chem 53:6531-6536 (2005)
  - 12) Moskowitz RW. Role of collagen hydrolysate in bone and joint disease. Semin Arthritis Rheum 30:87-99 (2000)
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