

**SOLUGEL**<sup>®</sup>  
collagen peptides

BEAUTY  
FROM  
WITHIN

The natural solution  
**FOR YOUR SKIN HEALTH**



  
**PBLEINER**  
The Clear Solution

A woman with dark hair and eyes is shown in profile, drinking water from a clear glass. She is wearing a grey tank top. The background is white. A blue curved shape is in the top left corner, containing the text 'COLLAGEN HELPS YOU FIGHT SKIN AGING'.

## COLLAGEN HELPS YOU FIGHT SKIN AGING

### “Beauty from within” industry is growing

One of the key consumer trends in recent years is the holistic approach to health and beauty. Having traditionally focused on the purchase of products with topical applications (e.g. face creams) to enhance their outward appearance, the consumers are now turning towards products such as supplements, and functional foods and beverages (also known as nutricosmetics) to enhance their appearance. This trend and belief that outward appearance is dependent on the “inner well-being” has spread from Asia to other parts of the world, and it is driving the growth of the nutricosmetic industry, including skin care supplements with anti-aging properties. The global nutricosmetics market is expected to grow at a compound rate of over 5% during the period 2018-2022.<sup>1</sup>

Skincare dominates the nutricosmetic market, and one of the key drivers is the aging population. The main ingredients used in skincare products are vitamins, collagen peptides, and enzymes.<sup>2</sup>

## Collagen makes up more than 70% of the skin's dry weight

Skin appearance reflects health and general well-being. As our protective shield, our skin is subjected to constant pressure from external, environmental factors (sun, wind, etc.), but also from stress, which exacerbates the aging process. At the age of 30, the human skin begins to change, characterized by alterations to the dermal connective tissue.

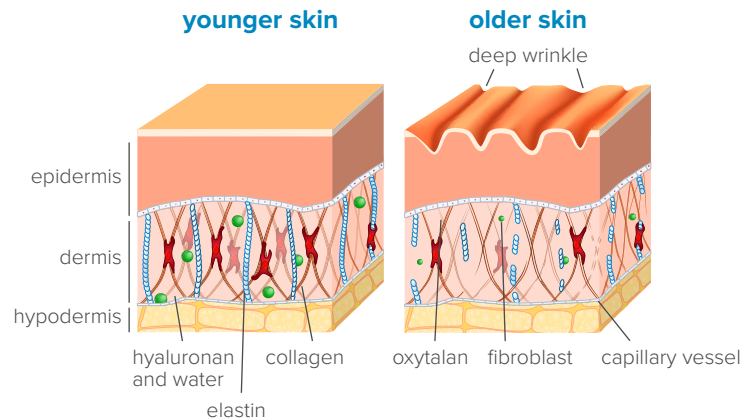
Collagen is an important protein for the connective tissue: in the dermis of human skin, collagen makes up more than 70% of the skin's dry weight. The body is capable of making at least 28 different types of collagen, but the two types that are key to skin health and beauty are collagen type I and type III.

## Healthy collagen levels are essential

Collagen levels are particularly important for the strength and resilience of the skin, and alterations in their number and structure are thought to be responsible for wrinkle formation, loss of skin smoothness and hydration.

Hence, healthy collagen levels are essential for

- skin elasticity
- skin smoothness
- skin hydration







## Collagen regeneration decreases in aged skin

Collagen is a structural protein. It is created from precursor molecules that are formed in special cells in the dermis, called fibroblasts. Fibroblasts also produce other structural elements, such as elastin and hyaluronic acid.

Collagen formation and breakdown take place in the dermis. Specific enzymes (metalloproteinases) break down collagen while collagen renewal occurs continuously throughout our lives to repair and replace damaged tissue or to build new cellular structures.

As skin ages, collagen becomes more and more fragmented as enzyme breakdown becomes more active while collagen production by the fibroblasts decreases. As a result, the skin of an 80-year-old demonstrates 4 times more broken collagen than the skin of someone aged 21-30.

## SOLUGEL® REVEALS BEAUTY FROM WITHIN

### Collagen peptides trigger the body to make more collagen

Over the past decade, there has been increased interest in what can be done to protect collagen levels in the skin, to prevent collagen degradation and to promote synthesis of new collagen even as the skin ages.

Scientific studies show that collagen synthesis can be promoted by small stimulating peptides obtained from natural collagen source. <sup>3,4,5,6</sup>

### Highly digestible protein

Collagen peptides are highly digestible proteins. These proteins, as they are, cannot be absorbed quickly in the gastrointestinal tract. By breaking them down or hydrolyzing them enzymatically into small peptides, a product is obtained that can be easily absorbed by the

# SOLUGEL® SCIENTIFICALLY- PROVEN BEAUTY EFFECTS

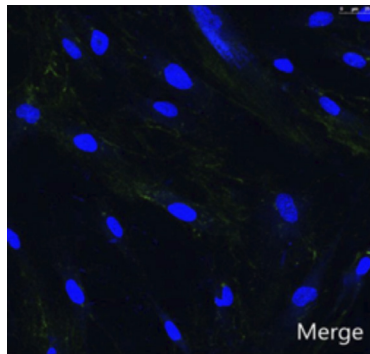
## Precious in so many ways

SOLUGEL® collagen peptides dissolve at room temperature and have a neutral odor and flavor. They are available with different functional properties and can be based on different raw materials, which include halal and kosher and pasture-raised products.

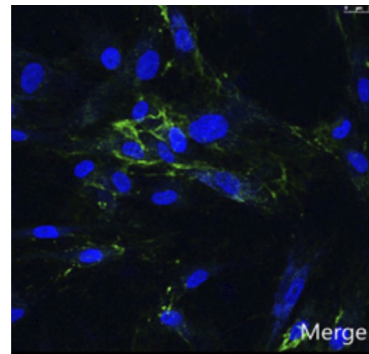
As highly digestible proteins, SOLUGEL® collagen peptides are quickly absorbed by the body. SOLUGEL® adds value for a variety of applications, from food supplements to nutrient-enriched foods.

SOLUGEL® is made up of high-quality collagen peptides obtained by enzymatic hydrolysis. These peptides, obtained from natural sources, can be easily digested and absorbed by the human body. Some of the resulting smaller peptides are specifically “attracted” to the fibroblasts, where they exert specific functions. Several studies on animal and human fibroblasts performed over the last decade show in vitro and in vivo evidence that collagen peptides trigger the body to make more of its own collagen by activating the fibroblasts. It has been scientifically proven that SOLUGEL® significantly increases the collagen synthesis in human dermal fibroblast by  $115.4 \pm 13.2 \%$ .

control



SOLUGEL®



Human Dermal Fibroblast culture (blue) after a 24-hour treatment. An increased collagen expression (green) can be observed when treated with SOLUGEL® compared to the control. <sup>7</sup>

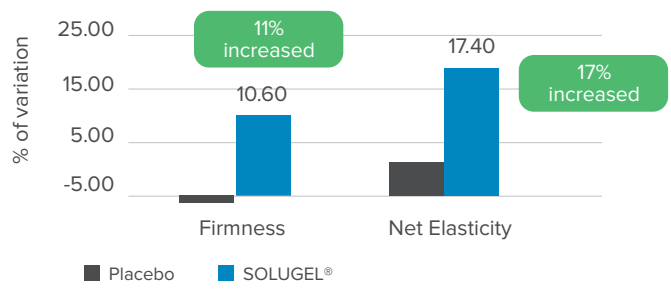


“Oral intake of 10g of SOLUGEL® significantly improves skin elasticity, firmness and hydration after 56 days.”

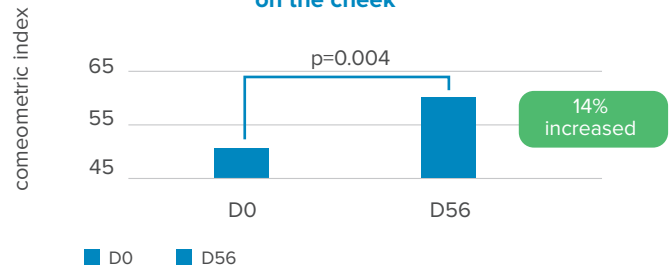
2017 PB Leiner’s clinical study at Cosderma, France

Moreover, a placebo-controlled double-blind clinical study carried out at the institute of Cosderma in France over a period of 56 days proved the positive effects of the oral intake of 10g SOLUGEL® in terms of skin elasticity, firmness, as well as skin hydration.

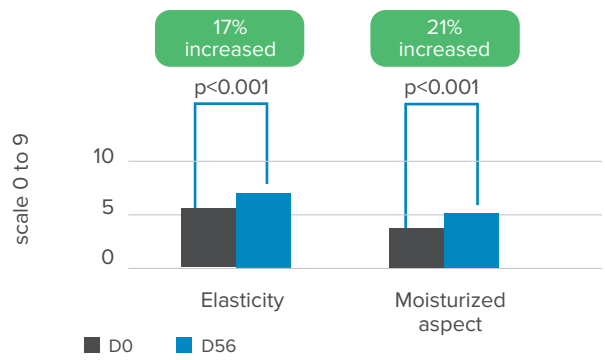
### Better firmness and elasticity effects on the temple, D56



### Moisturizing effects on the cheek



### Clinical scoring evaluated by dermatologist on forearm



# SOLUGEL® PERFORMS

Several human clinical trials have confirmed that daily ingestion of between 5-10 g/day of collagen peptides for 4 to 12 weeks will positively affect the facial skin's moisture content, elasticity, fine lines and smoothness.

Dosage	Duration	Effect	Ref
5 g/day	8 weeks	Significant increase of skin elasticity	8
10 g/day	12 weeks	Significantly increased: <ul style="list-style-type: none"> <li>• skin hydration (28%)</li> <li>• collagen density in the dermis (8.83%)</li> </ul>	9
7 g/day	8 weeks	Significant improvement in: <ul style="list-style-type: none"> <li>• periorbital wrinkles and aging (<math>p &lt; 0.001</math>)</li> <li>• overall facial aging (<math>p &lt; 0.006</math>)</li> </ul>	10

## References

- 1 Global Nutricosmetics Market 2018-2022 Technavio, 2018
  - 2 Nutricosmetics Market - Analysis of Growth, Trends Progress and Challenges (2019 - 2024) Mordor Intelligence Report, 2017
  - 3 Shigemura, Y., Iwai, K., Morimatsu, F., Iwamoto, T., Mori, T., Oda, C., Taira, T., Park, E.Y., Nakamura, Y. and Dato, K. (2009). Effect of prolyl-hydroxyproline (Pro-Hyp), a food-derived collagen peptide in human blood, on growth of fibroblasts from mouse skin. *J. Agric. Food Chem.*, Vol. 57, Iss. 2, 444-449
  - 4 Ohara, H., Ichikawa, S., Matsumoto, H., Akiyama, M., Fujimoto, N., Kobayashi, T. And Tajima, S. (2010) Collagen-derived dipeptide, proline-hydroxyproline, stimulates cell proliferation and hyaluronic acid synthesis in cultured human dermal fibroblasts. *The Journal of Dermatology*, Vol. 37, Iss.4, 330-338.
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  - 6 Okawa, T., Yamaguchi, Y., Takada, S., Sakai, Y., Numata, N., Nakamura, F., Nagashima, Y., Ikezawa, Z. and Aihara, M. (2012). Oral administration of collagen tripeptide improves dryness and pruritus in the acetone-induced dry skin model. *J. Dermatol. Sci.*, Vol. 66, Iss. 2, 136-143.
  - 7 Source: internal data 2018, "In vitro analysis of collagen levels after treatment with SOLUGEL® on dermal human fibroblasts using confocal microscopy". Study performed by Bionos Biotech, S.L.
  - 8 Proksch, E., Segger, D., Degwert, J., Schunck, M., Zague, V. and Oesser, S. (2014). Oral supplementation of specific collagen peptides has beneficial effects on human skin physiology: a double-blind, placebo-controlled study. *Skin Pharmacol. Physiol.*, Vol. 27, Iss. 1, 47-55.
  - 9 Asserin, J., Lati, E., Shioya, T., Prawitt, J. (2015). The effect of oral collagen peptide supplementation on skin moisture and the dermal collagen network: evidence from an ex vivo model and randomized, placebo-controlled clinical trials. *Journal of Cosmetic Dermatology*, 14, 291–301
  - 10 Kantor, I., Donikyan, L.A., Simon, E. And Wollschlaeger, B. (2002). Results of a study evaluating the use of a dietary supplement formula in the management of age-related skin changes in women with moderate to severe wrinkling of the periorbital area. *The Journal of the American Nutraceutical Association*, Vol. 5, Iss. 2, 10-19.
- \* Additional information about scientific studies supporting these health claims are available upon request.

**SOLUGEL®**  
collagen peptides

Brings elasticity, smoothness  
and hydration to the skin



**SOLUGEL®**  
collagen peptides

Helps maintain strong bones  
and healthy joints



**SOLUGEL®**  
collagen peptides

Offers a unique combination  
of amino acids for sports and  
active lifestyle



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The Clear Solution

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