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GLOBAL

PERSONAL CARE

INGREDIENTS • FORMULATION • MANUFACTURE

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The future of collagen innovation

Learn more

Collagen is the structural backbone of the skin, ensuring its strength, resilience, and youthful appearance. However, with age and environmental stressors, collagen synthesis declines, leading to visible signs of aging such as wrinkles and loss of firmness. While the cosmetics industry has long sought to replenish collagen, traditional approaches often fall short of delivering truly biomimetic, effective, and sensorially appealing solutions. Until now.

Discover collapeptyl™ biofunctional and the Collaverse™—the intricate ecosystem of 28 diverse and interconnected collagens that maintain skin integrity and youth. Inspired by the natural ability of dermal hyaluronic acid molecules to house, protect and distribute skin peptides, collapeptyl™ biofunctional is the next generation hyalupeptide hybrid, a vegan suitable, 99.7% natural (according to ISO 16128) collagen peptide solution designed to work in harmony with the skin, unlocking its full potential. Why? Because Ashland's team of R&D solvers have harnessed the science of molecular modeling to optimize the binding affinity of two powerful anti-aging peptides to a short-chain hyaluronic acid molecule.

By mimicking 20 key collagen sequences, this innovative active offers dual-action power: an instant glass-like glow with a velvet-smooth feel, combined with long-lasting biological effects—correcting

appearance of expression wrinkles in just 4 hours and deep wrinkles in 1 month.

Powered by groundbreaking patent-pending 2HP™ technology (Hyaluronic Hybrid Peptide), this unique texturactive™ ingredient is not only a performance-driven collagen booster delivering exceptional and rapid visible benefits but also a sensorial experience with a velvet, smooth after-feel that elevates every formulation. This article delves into the science behind collapeptyl™, exploring how advanced bioengineering, peptide and molecular modeling innovation, are shaping the future of collagen innovation in skin care.

Now with collapeptyl™ biofunctional, you too can transform your formulations, by bridging science, sensoriality, and efficacy like never before.

How AI enabled the design of the perfect matrix-mimetic 3D hybrid

As unlikely as it may seem, the composition of collapeptyl™ biofunctional was determined by the artificial intelligence. The first identified component was hydrolyzed hyaluronic acid. Hyaluronic acid, key molecule of skin aging, is a natural glycosaminoglycan, composed of repeating polymeric disaccharides of glucuronic acid and N-acetylglucosamine. Due to its unique physico-chemical properties, collapeptyl™ biofunctional offers a wide configuration and shapes of HA each dependent on different parameters including the size and the pH, allowing different an even wider range of applications including drug delivery systems.[1]

Through molecular modeling, two peptides, known for their anti-aging efficiency, were selected for their strong

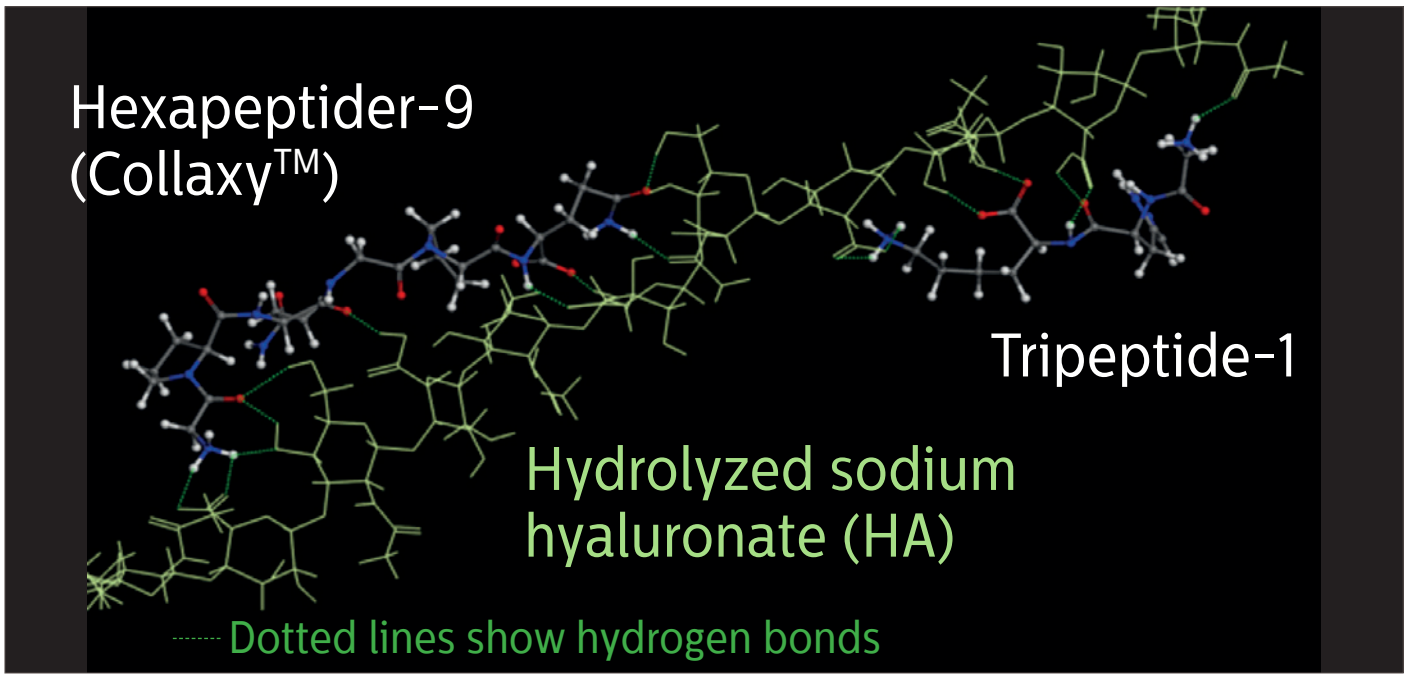


Figure 1: Self-assembled interaction shown by molecular modeling science

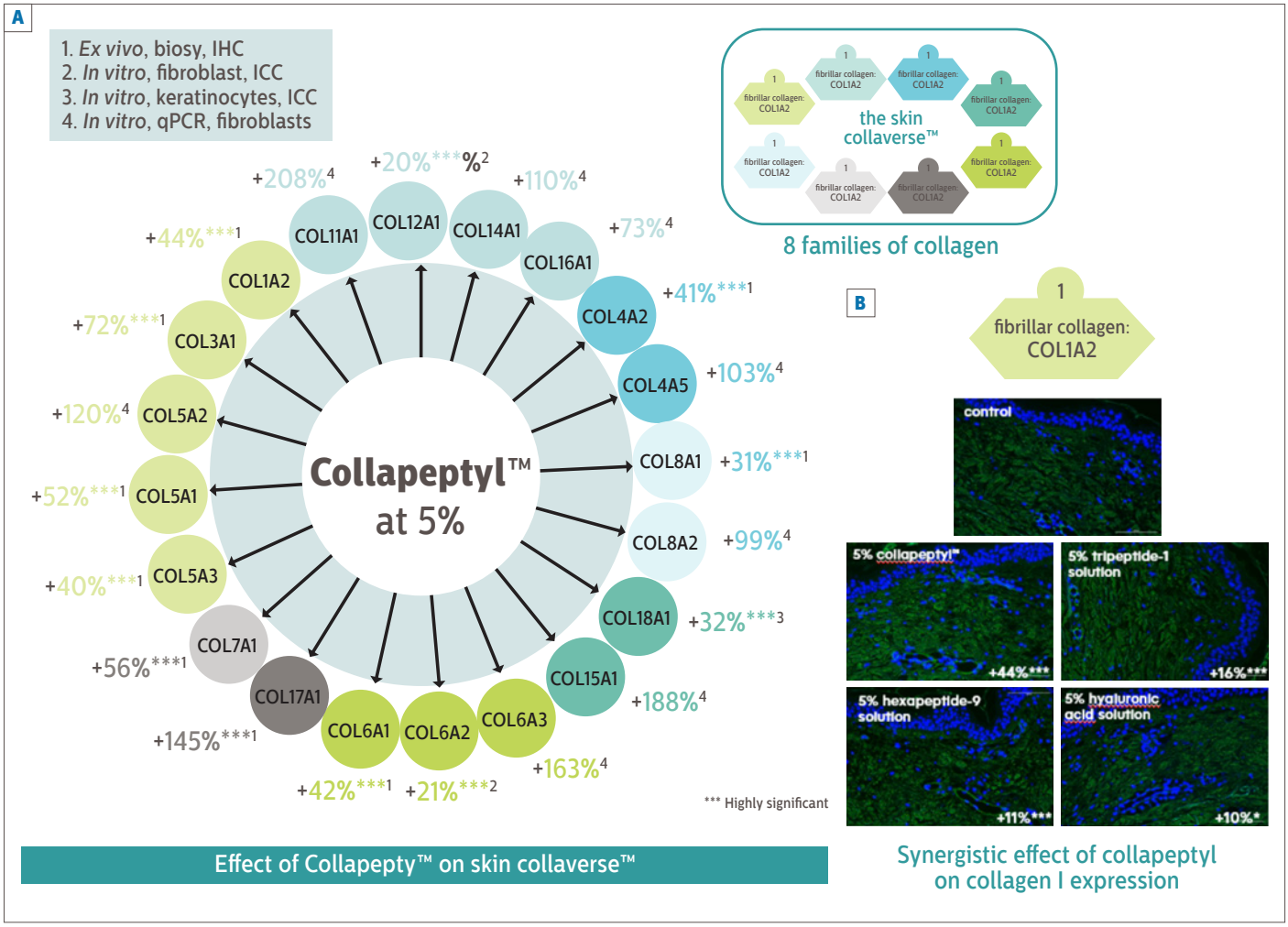


Figure 2: Effect of collapeptyl on skin collaverse™ (a) and focus on synergistic effect of collapeptyl on collagen I expression (b)

interactions with hyaluronic acid molecule. Tripeptide-1 upregulates collagen, elastin and glycosaminoglycan production in fibroblasts;[2] and hexapeptide-9, is a well-known anti-aging peptide with the ability to facilitate skin regeneration and to reinforce the extracellular matrix.[3,4]

Thus, the computed peptides/HA interaction energy was due to the self-assembled hydrogen bonding, shown in figure 1. To strengthen these interactions and boost the efficiency of collapeptyl™, a new technology was created: 2HP™ technology based on the use of a specific size of hyaluronic acid (≤ 5 kDa) added to an optimal concentration of each component and a key step during the process. To complete the design of collapeptyl™, the complex peptides/HA was integrated in cellulose gum bringing new texturing property of this unique biofunctional.

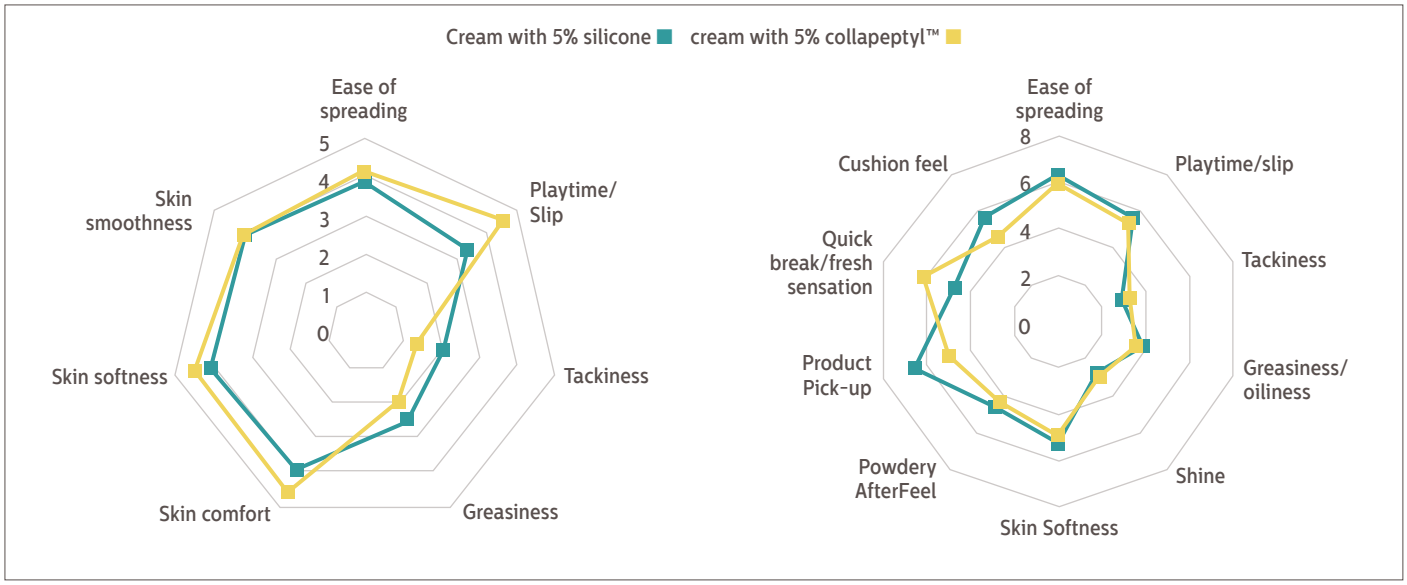
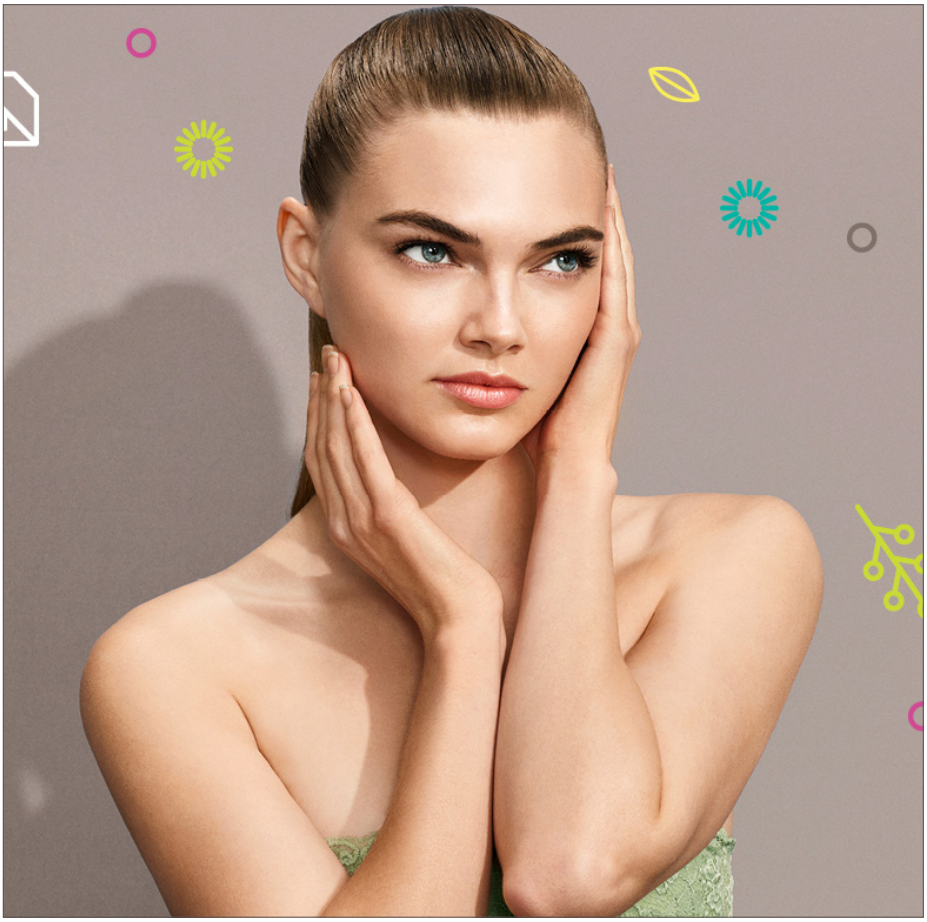


Figure 3: Evaluation of the sensorial effect of collapeptyl™ formulated at 5%



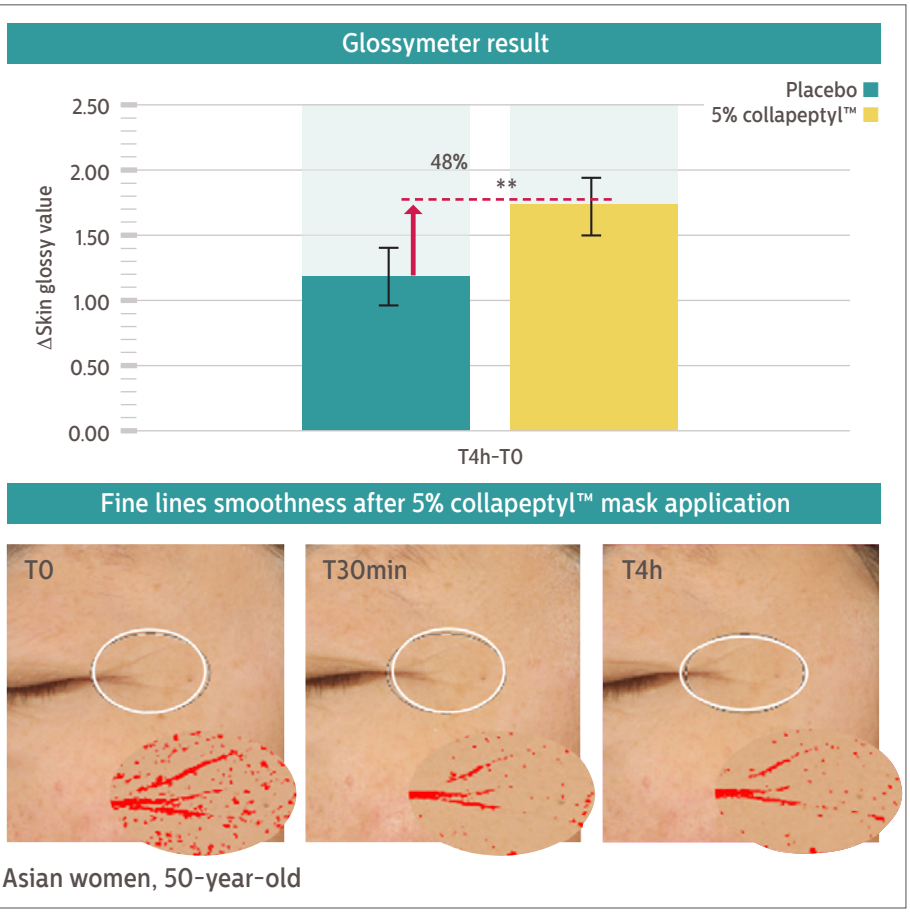


Figure 4: Glow and smooth effect of 5% collapeptyl™ biofunctional on Asian volunteers

Boosting 20 collagen chains of the skin collaverse™

We first investigated the synergistic effect of our bifunctional in *ex vivo* skin on the level of two key markers of skin, collagen I and hyaluronic acid. The topical application of 5% collapeptyl™ on normal skin biopsies was associated with an observed increase in collagen I and hyaluronic acid contents after 48 hours (+ 44% and +57% respectively) (Figure 2). Solutions containing each constituent isolated of collapeptyl™ at the same concentration found in 5% collapeptyl™, applied on the same ex vivo skin, showed a smaller effect than collapeptyl™. Moreover, if we combine the effect of each component of collapeptyl™ given separately, collapeptyl™ effect is greater, demonstrating the synergistic effect of collapeptyl™(Figure 2).

Secondly, the effect of collapeptyl™ was studied on different parts of the collagen family. which comprises 28 members, 20 of which are skin related in what we call the collaverse™. Based on their structural and functional properties, this collaverse™ superfamily can be divided into several categories. The best represented category is fibril-forming collagens, including collagens I and III, which constitute over 90% of skin's collagen content. The others, nonfibrils-forming collagens, are divided into 7 categories: fibrils-associated collagens, network-forming collagens, multiplexin collagens, beaded filament-forming collagen, transmembrane collagens, anchoring fibrils and hexagonal network-forming collagens.[5] Even if these collagens are considered as a minority in skin, their roles are essential in cell anchorage, structural function and signaling.[6]

The sequences of peptides used in collapeptyl™ match with 20 collagens sequences. Thus, during this study, the effect of collapeptyl™ was investigated on the expression of 20 collagen-chains distributed in the 8 collagen's categories on skin biopsies, on in vitro fibroblasts and keratinocytes either by immunostaining or by qPCR. The results obtained following the application of 5% collapeptyl™ on *ex vivo* skin or 0.5% of collapeptyl™ on *in vitro* cells, showed an enhancement in all collagens studied and were summarized in Figure 2.

Exploring collapeptyl™ as a sensorial booster

The sensorial effect of collapeptyl™, provided by the cellulose gum part, was assessed by comparing a formula containing 5% collapeptyl™ with a formula containing 5% silicone, on two different blind panels (8 experts and 10 non-experts). Both panelists found that the cream containing collapeptyl™ had the same texturing effect than the silicone formulation with a better quick break and playtime highlighting the texturing effect of the biofunctional (Figure 3).

Visual skin benefits, tested on Caucasian and Asian panel

Two clinical double-blind studies were designed to highlight the interest to combine

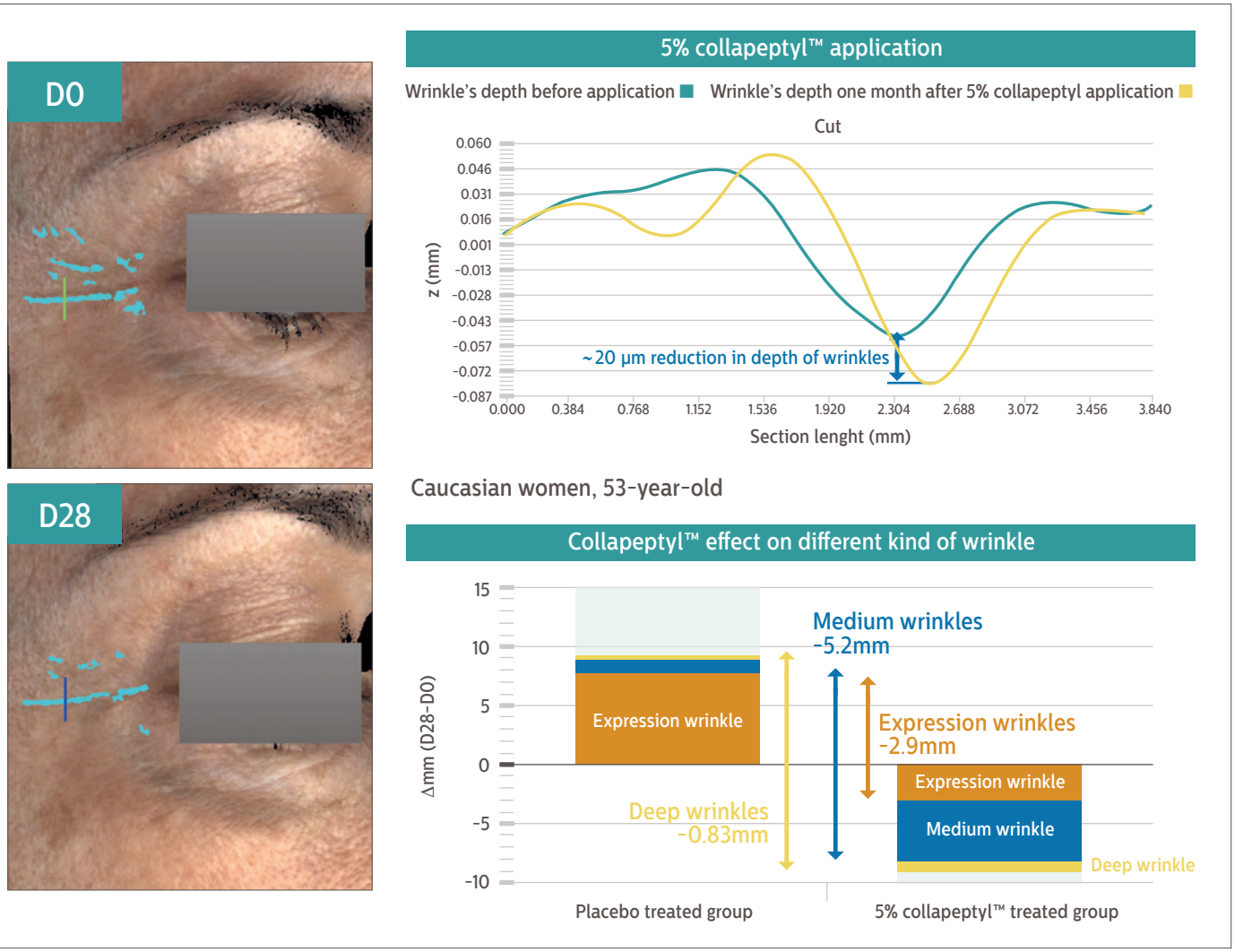


Figure 5: Wrinkles depth evaluation of eye contour after 1 month of application with 5% collapeptyl™ containing cream

cellulosic gum element with molecular complex peptides/HA. The first one, consisting in applying a mask, containing 5% of collapeptyl™ on one side of the face and a placebo mask on the other side of the face, demonstrated an instant glass-like radiant and smooth, hydrated skin after 30min and 4h of mask removal on 30 Asian volunteers (Figure 4).

The second study was long-term, carried out on 34 volunteers divided in two homogeneous groups. Both groups applied a cream containing 5% biofunctional or its placebo for 1 month. Since D14, the skin hydration increased significantly by 272% compared to placebo with a smoother and softer skin. These effects remained after 1 month of application accompanied by an improvement in skin elasticity for the group applying collapeptyl™ cream. Likewise, after one month of applications, with the biofunctional containing cream, softens the appearance of wrinkles of the crow's feet area but also under the eye, significantly decreased in circumference by -196% and in depth by -105% with an impact of all kinds of wrinkles (Figure 5).

In summary, collapeptyl™ biofunctional helps hydrate and smooth the skin after 30min and 4h of mask application with increasing skin glow, giving a glass skin aspect. Additionally, collapeptyl™ improves skin elasticity and hydration after 1 month of application. Besides the instrumental measurements, volunteers observed a clear reduction in appearance of wrinkles and an improvement in skin global appearance (better hydration, glow and elasticity).

A game-changer in the 'iconic' collagen world, collapeptyl™ helps deliver both functional and sensory benefits. Globally approved, and tested on Caucasian and Asian skin type, collapeptyl™ biofunctional blurs the line offering a rapid transformative effect, skin feel and measurables results by consumers. Easy to formulate, it is compatible with serums, gels, masks and creams. More than skincare, this is a revolution in collagen science, a breakthrough in sensorial beauty, unlocking your skin's full potential. **PC**

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Ashland
500 Hercules Road,
Wilmington, DE 19808, USA
www.ashland.com