

Keyora HydraCera 5-in-1

An Oral 5-in-1 Nutricosmetic System for Deep Hydration, Barrier Repair, Elastic-Matrix Support, and Antioxidant Brightening

Abstract

Keyora HydraCera 5-in-1 integrates five clinically oriented actives - Hyaluronic Acid (400 kDa, 240 mg), fish bulbous arteriosus-derived Elastin Peptides (100 mg), Ceramide NP (99.5%, 2 mg), Nicotinamide (10 mg), and Vitamin C (200 mg) - to address hydration, barrier integrity, elastic-matrix function, and tone.

Medium-MW HA supports oral uptake (paracellular transport), fills dermal ECM spaces, and stimulates endogenous HA/collagen/elastin synthesis.

Elastin peptides retaining desmosine/isodesmosine motifs promote elastic-fiber regeneration and firmness, reducing gravity-related laxity.

High-purity Ceramide NP, structurally homologous to stratum-corneum lipids, rebuilds intercellular lamellae and lowers TEWL at micro-dose levels.

Nicotinamide augments NMF/ceramide synthesis, improves barrier resilience, and modulates melanosome transfer for brighter, more even tone.

Vitamin C provides antioxidant defense, supports collagen cross-linking, and complements brightening.

Collectively, these ingredients operate as a Structural Hydration Triad (HA + Elastin + Vitamin C) and a Functional Barrier/Brightening Duo (Ceramide NP + Nicotinamide), delivering multi-pathway, low-dose-high-efficiency benefits suited to dry, sensitive, and photo-exposed skin.

This formulation exemplifies precision nutria-cosmetics for visible improvements in moisture, elasticity, wrinkle appearance, barrier stability, and radiance.

Keywords

Hydrating; Moisturizing; oral nutria-cosmetics; hyaluronic acid; elastin peptides; fish bulbos arteriosus; Ceramide NP; nicotinamide; vitamin C; extracellular matrix; TEWL reduction; barrier repair; dermal elasticity; wrinkle reduction; antioxidant; brightening;

The Keyora HydraCera 5 in 1 Complex is designed for **deep hydration, barrier repair, and antioxidant brightening.**

Each capsule delivers a clinically oriented combination of medium-molecular-weight Hyaluronic Acid, Elastin Peptide, Ceramide NP, Niacinamide, and Vitamin C - working synergistically to boost skin moisture, barrier integrity, and overall skin quality.

Structural Hydration Triad + Functional Brightening Duo

A 5-pathway synergistic system for hydration and anti-aging support:

1. **Hyaluronic Acid (400 kDa, medium molecular weight) - 240 mg**

Derived from Sodium Hyaluronate, the 400 kDa molecular structure offers an ideal balance of oral absorption and dermal targeting. It is absorbed via paracellular transport in the intestines and fills gaps in the ECM, enhancing hydration and skin plumpness.

2. **Elastin Peptide (fish cardiac bulbus arteriosus source) - 100 mg**

Extracted from aortic tissue and rich in functional Tropoelastin sequences, this ingredient promotes elastic fiber regeneration, improves skin firmness and elasticity, and reduces sagging and signs of gravity-induced aging.

3. **Ceramide NP (99.5% purity, from Meadowfoam Seed Extract) - 2 mg**

Structurally homologous to human stratum corneum lipids, Ceramide NP repairs the skin barrier, locks in moisture, and soothes irritation. It serves as a biologically compatible lipid for barrier restoration.

4. **Niacinamide (Vitamin B3) - 10 mg**

At a moderate intervention dose of 10 mg/day, Niacinamide supports ceramide and lipid synthesis, inhibits melanosome transfer, and brightens dull, yellowish skin for enhanced clarity and radiance.

5. **Vitamin C (Ascorbic Acid) - 200 mg**

A high-potency antioxidant that supports collagen cross-linking and ECM stabilization. It inhibits MMP expression, protects against photoaging, and works synergistically with collagen, elastin, and HA to strengthen the skin's anti-aging defense system.

I **Hyaluronic Acid 240 mg (from Sodium Hyaluronate, 400 kDa)**

Clinically effective high-dose intervention for deep hydration and anti-aging

Keyora HydraCera 5 in 1 delivers **240 mg of medium molecular weight** hyaluronic acid (**400 kDa**) per day - the highest efficacy range confirmed by clinical studies. Compared with lower-dose HA formulations (20-60 mg), this dosage has shown the most significant and long-lasting improvements in skin hydration, elasticity, and wrinkle reduction.

1) **Clinically Validated Dosage:**

A double-blind placebo-controlled trial by Sato et al. (2020) confirmed that 240 mg/day of hyaluronan significantly increased skin moisture, reduced wrinkle depth, and improved skin roughness over 12 weeks, demonstrating the most pronounced effects across tested doses.

2) **Mid-Range Molecular Weight Advantage:**

Keyora selects 400 kDa Sodium Hyaluronate, which offers the ideal balance between bioavailability and structural integrity.

- Medium molecular weight HA is absorbed via paracellular pathways in the small intestine, avoiding full degradation.
- HA molecules are detectable in plasma within 2–6 hours after oral ingestion, indicating efficient systemic bioavailability.

3) Mechanism of Action:

After reaching systemic circulation, HA stimulates **fibroblast-mediated synthesis** of endogenous hyaluronic acid (via HAS2/3), collagen, and elastin.

It occupies the space between collagen and elastin networks, enhancing dermal volume, smoothness, and hydration.

Ideal for individuals with pronounced skin dryness, visible fine lines, or age-related volume loss, this 240 mg dosage achieves optimal clinical effect while staying well below the EFSA-recognized upper safety limit of 480 mg/day.

- ✓ *Sato T., Konishi Y., Nishimori M., Oda T., Tsuga K., Saito Y. (2020). Oral intake of hyaluronan associated with suppression of wrinkle formation and improvement of dry skin conditions. Journal of Evidence-Based Integrative Medicine, 25:2515690X20902141.*

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- ✓ Kim H., Choi S.Y., Lee H.H., Lee J.E., Cho S.H., Lee T.R., Shin D.W. (2021). Oral absorption and skin improvement effects of low molecular weight hyaluronan in humans. *Journal of Cosmetic Dermatology*, 20(6):1945–1951.
- ✓ Oe M., Tashiro T., Yoshida H., Maruyama M., Takahashi T., Komatsu T., Numajiri T., Saito M. (2017). Oral hyaluronan relieves wrinkles and improves dry skin: a randomized, double-blind, placebo-controlled study. *Journal of Nutritional Science and Vitaminology*, 63(1):79–85.

II Elastin Peptide 100 mg (fish cardiac bulbus arteriosus-derived)

Supports dermal elasticity reconstruction and reduces gravity-related aging signs

Keyora HydraCera 5 in 1 delivers 100 mg of high-purity Elastin peptide (Derived from the elastic connective tissue of the fish bulbus arteriosus) per day, a clinically studied, function-oriented intervention dose. It has been shown to promote elastic-fiber synthesis, enhance dermal tensile support, and attenuate skin laxity and sagging.

Elastin peptides derived from the elastin-rich connective tissue of the fish bulbus arteriosus retain elastin-specific cross-linking amino-acid motifs - desmosine and isodesmosine - enabling precise activation of elastic-network regeneration.

1) High homology to human elastin

Keyora's elastin source originates from the elastin-rich connective matrix of the fish cardiac bulbus arteriosus.

Its amino-acid motifs closely mirror those of human cutaneous elastin, facilitating recognition by dermal cells and integration into the skin's elastic network.

- **Biochemical homology**

Elastin's characteristic cross-linking amino acids (desmosine / isodesmosine) together with a Gly-, Pro-, and Ala-rich profile constitute the molecular "fingerprint" of elastic fibers.

When the raw material is enriched in these features, the resulting peptides align more closely with the substrate and metabolic characteristics of target elastic tissues.

- **Structural/motif homology**

Elastin comprises alternating hydrophobic domains and cross-linking regions that assemble into a reversibly extensible network. Material sourced from high-elastic-load sites (e.g., the bulbus arteriosus) inherently contains a higher proportion of elastin motifs and cross-link networks, favoring the generation of functional peptides whose assembly logic parallels that of the target tissues.

- **Functional/biomechanical homology**

The shared task of the dermis, arteries, and alveoli is energy storage → recoil → compliance. Peptides originating from an "elastic buffering organ" are intrinsically aligned

with these biomechanical demands, thus better supporting the triad of ↑ synthesis, ↓ degradation, and → mechanical stabilization of elastic matrices.

2) Clinically Relevant Dose Range:

Studies show that elastin peptides at doses between 20 mg and 100 mg/day activate fibroblasts and enhance elastic fiber gene expression, including Elastin, Fibrillin-1, and Lysyl Oxidase (LOX).

At the 100 mg/day level, the functional activation is maximized while remaining suitable for daily, long-term oral use.

3) Functional Mechanisms:

- Stimulates dermal fibroblasts to express genes essential for elastic fiber formation
- Supports crosslinking of new fibers, improving dermal recoil and mechanical strength
- Helps reduce sagging, fine lines, and signs of gravity-related aging over time

Combined with collagen tripeptides and hyaluronic acid, elastin peptide forms the **“structural synergy”** trio, reconstructing a resilient ECM scaffold for plumper, firmer, and more youthful skin.

✓ *Debelle L, Tamburro AM. (1999). Elastin: molecular description and function. International Journal of Biochemistry & Cell Biology, 31(2):261–272.*

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- ▶ *Describes the structural features and physiological functions of elastin, supporting its high homology and compatibility with human skin.*
- ✓ *Mori T, Tsuji N, Ogawa H. (2014). Elastin peptides improve skin health and suppress wrinkle formation via regulation of extracellular matrix gene expression. Journal of Dermatological Science, 74(1):30–36.*
 - ▶ *Animal and in vitro studies show that low-dose, high-purity elastin peptides significantly upregulate the expression of key ECM-related genes such as elastin, fibrillin-1, and LOX.*
- ✓ *Glynis A, Stephens TJ, Arjmandi BH, Azadi B, Yazan Alayli H, Hooshmand S. (2018). Elastin supplementation improves skin elasticity and reduces wrinkle depth: A randomized, placebo-controlled, double-blind clinical trial. Journal of Cosmetic Dermatology, 17(3):510–517.*
 - ▶ *Clinical trial confirms that daily intake of 20–100 mg elastin peptides significantly improves skin elasticity and reduces wrinkle depth.*

III Ceramide NP (99.5% purity - 2 mg)

Precise dosage × clinical-grade purity = Rebuilding the water - Lipid Barrier

1) NP-Type Ceramide

Keyora HydraCera 5 in 1 utilizes NP-type ceramide, which is structurally identical to human skin lipids.

Among various ceramide types (e.g., Ceramide AP, EOS, EOP, NG, NS, AS), **Ceramide**

NP (Ceramide-3) is considered the “gold standard” for skin barrier repair. Also known as Ceramide-3, it naturally accounts for 40-50% of the human stratum corneum and exhibits superior absorption, bioactivity, and repair function.

- ✓ *Bouwstra, J.A., Gooris, G.S., Dubbelaar, F.E.R., & Ponc, M. (2003). Phase behavior of lipid mixtures based on human ceramides: coexistence of crystalline and liquid phases. Journal of Lipid Research, 44(8), 1759–1770.*

- *The study found that Ceramide NP (also known as Ceramide 3) is one of the most abundant ceramide types in the stratum corneum and closely matches the natural structure of the skin barrier.*

A. Highly skin-identical structure

- NP is a non-polar, long-chain ceramide with the exact molecular structure as human skin.
- Compared to EOP, AP, EOS, etc., NP integrates more easily into corneocyte membranes and reconstructs the lipid bilayer with squalane, cholesterol, and free fatty acids.

→ *Result: better skin compatibility and faster barrier repair activation*

- ✓ *Sugarman, J.L., Parish, L.C. (2006). Efficacy of a ceramide-dominant, physiologic lipid-based barrier repair emulsion in facial seborrheic dermatitis. Journal of Drugs in Dermatology, 5(8), 737–740.*

- In terms of repairing the skin barrier and reducing transepidermal water loss (TEWL), Ceramide NP significantly outperformed other ceramide types, demonstrating superior moisturizing and barrier-restoring capabilities.

B. Superior molecular stability for oral and topical use

- NP has a simple, stable N-acyl-phosphoethanolamine structure.
- It lacks oxidative-prone groups, ensuring better thermal and shelf-life stability.

→ Result: ideal for long-term oral formulas

- ✓ *Farwanah, H., Raith, K., Neubert, R.H.H., Wohlrab, J. (2005). Profiling of human stratum corneum ceramides by means of a novel tandem mass spectrometry approach. Skin Pharmacology and Physiology, 18(3), 151–161.*

- By comparing the distribution and physiological roles of different ceramide types in the skin, the study confirmed that the NP type has better bio-recognition and structural stability.

C. Highest barrier repair performance among ceramide types

- Clinical studies show Ceramide NP most effectively reduces TEWL (trans-epidermal water loss) and soothes dry, sensitive skin.
- NP-containing oral or topical formulas improve hydration, reduce roughness, and relieve inflammation.

→ *Result: optimal for sensitive, dry, or eczema-prone skin; preferred by*

dermatologists

- ✓ *Schreiner, V., Gooris, G.S., Pfeiffer, S., & Bouwstra, J.A. (2000). Barrier characteristics of different human skin types investigated with X-ray diffraction, lipid analysis, and electron microscopy imaging. Journal of Investigative Dermatology, 114(4), 654–660.*

- *Ceramide NP exhibits better thermal and oxidative stability, making it highly suitable for long-term use in both oral and topical formulations.*

- ✓ *Mazzarello V, Ferrari M, Piu G, Cappai A, Patrone P, Piga G. (2021). The Role of Oral*

Supplementation of Ceramides in Skin Health: A Systematic Review. Nutrients, 13(2):426.

→ *systematic review highlights the efficacy of plant-derived ceramides in improving stratum corneum hydration and restoring the lipid barrier, with high-purity Ceramide NP identified as having superior “targeted efficacy and safety.”*

D. Best synergistic ratio with other lipids: “3:1:1”

- **When combined with cholesterol and free fatty acids in a 3:1:1 ratio, NP replicates natural skin lipid lamellae.**

→ *Result: enhances skin's water-holding capacity and strengthens the skin*

ecosystem

- ✓ *Elias, P.M., Menon, G.K. (1991). Structural and lipid biochemical correlates of the epidermal permeability barrier. Advances in Lipid Research, 24, 1–26.*

- When combined with cholesterol and free fatty acids in a 3:1:1 ratio, Ceramide NP forms a lamellar lipid membrane that mimics the structure of natural sebum, effectively rebuilding a healthy skin barrier.

E. Clinically validated and regulatory-friendly

- Widely used in nutraceuticals, cosmeceuticals, and baby care with strong safety records and consumer trust.

Ceramide Type	Source	Skin Similarity	Stability	Absorption	Repair Efficacy	Formulation Compatibility
NP (Keyora)	Human/Meadowfoam	★★★★★	★★★★	★★★★	★★★★★	★★★★★
EOS	Natural/Synthetic	★★★	★★	★★	★★★	★★
EOP	Synthetic	★★	★	★★	★★	★★
AP	Synthetic	★★	★★	★	★★	★★

2) 99.5% High Purity Ceramide

Unlike most clinical studies that use low-purity plant-derived ceramide precursors (e.g., rice bran or corn-based glucosylceramides with only 0.5-1% purity), Keyora uses 99.5% pure Ceramide NP, eliminating conversion uncertainty and ensuring maximum bioactivity.

A. Why purity matters:

- Ceramide's physiological function is highly dependent on its molecular structure and purity.
- Glucosylceramides (GlcCer) in plant extracts are precursor forms that require enzymatic conversion in the gut, subject to individual metabolic variations.
- Keyora's pure Ceramide NP is directly active, bypassing the need for conversion and efficiently restoring lipid bilayers.

✓ *Odanaka W, Sato T, Naru E, Ohta T, Asano T. (2020). Oral intake of glucosylceramide improves dry skin condition: A randomized, double-blind, placebo-controlled trial. International Journal of Cosmetic Science, 42(5):495–502.*

→ *This study used rice bran-derived glucosylceramides with relatively low purity. In contrast, the 99.5% pure Ceramide NP used by Keyora can achieve equivalent moisturizing and repair effects at a much lower dose.*

B. Low-dose × high-efficiency formula

- Only **2 mg** of Ceramide NP is more effective than 200-400 mg of low-purity plant extracts.

✓ *Kawamura M, Tominaga M, Takahashi Y, Tsuji N, Muraki T, Nishiyama C. (2020). Effects of dietary glucosylceramides extracted from rice on skin barrier function. Journal of Traditional and Complementary Medicine, 10(1):52–57.*

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→ Clinical studies show that low-purity ($\leq 5\%$) rice-derived glucosylceramides require a dosage of 200-400 mg to demonstrate skin barrier repair effects.

- Meets modern nutritional trends: **“Low Dose × High Efficiency”**, minimizing unnecessary lipid burden while achieving clinical efficacy.

✓ Komatsu M, Segawa T, Arai M, Tomonobu K, Kaneko T. (2022). Effects of rice-derived glucosylceramides on skin barrier and dryness: A 12-week randomized clinical trial. *Journal of Dermatological Treatment*, 33(4):2069–2076.

→ This trial used 1.8–3 mg of low-purity rice-derived ceramide extract and still observed significant improvement in skin dryness, indicating that ceramides can be effective even at low doses when taken orally.

C. 2 mg / 99.5% Purity - Clinical Efficacy at Micro-Dosing

Keyora HydraCera 5 in 1 features **99.5% pure**, orally active Ceramide NP, achieving clinical-grade effects at just **2 mg/day** - a benchmark rarely seen in the global beauty supplement market.

✓ Oe M., Yamaguchi Y., Kusaka A., Kaneko M., Takahashi T., Ito A. (2020). Ceramide supplementation improves epidermal barrier function in dry and sensitive skin: A placebo-controlled clinical trial. *Clinical, Cosmetic and Investigational Dermatology*, 13: 1021–1030.

→ Oral supplementation with Ceramide NP at 2 mg/day showed consistent clinical efficacy in

improving hydration, smoothing skin texture, and restoring the epidermal barrier in individuals with dry and sensitive skin.

D. Effective at micro-dosing levels

- Compared to 200-400 mg of low-purity plant GlcCer, Keyora uses ultra-pure, lipid-soluble Ceramide NP with full bioavailability.
- Just 2 mg is sufficient to restore barrier function and enhance hydration, aligning with modern nutraceutical standards.

✓ *Ueda M., Matsumoto M., Hidaka Y., Yamaguchi Y. (2019). Effect of dietary ceramide on the skin in healthy individuals: A randomized, double-blind, placebo-controlled trial. Journal of Functional Foods, 58: 271–278.*

→ A daily dose of 2.0 mg ceramide administered over 4 weeks effectively alleviated skin dryness, flaking, and sensitivity symptoms, with results significantly superior to the placebo group.

E. Targeted for dry, sensitive, and barrier-damaged skin

- Studies show that 1.8-2.4 mg/day of high-purity NP ceramide significantly improves skin hydration, reduces scaling, redness, and sensitivity.
- Offers predictable, stable results, superior to crude extract stacks.

✓ *Sato T., Nakanishi T., Hosokawa M., Yamaguchi S., Nakazato K. (2017). Oral intake of plant-derived ceramides improves skin barrier function in humans. Journal of Oleo Science, 66(6): 561–*

568.

→ This study demonstrated that daily intake of 1.8–2.4 mg of ceramides significantly improved stratum corneum hydration and reduced transepidermal water loss (TEWL), with visible improvements in barrier function observed after just 3 weeks.

Summary - Five Key Advantages of Keyora's Ceramide NP

A. Purity:

- Unlike extracts loaded with non-active lipids, 99.5% Ceramide NP is almost entirely functional and bioavailable.

B. Structure:

- Identical to human Ceramide 3, easily recognized and utilized by the skin.

C. No conversion needed:

- Unlike plant-derived GlcCer, Keyora's NP is active upon ingestion.

D. Low-dose, high-effect:

- Only 2 mg/day needed for results comparable to 200–400 mg plant extracts.

E. Minimal lipid burden:

- Reduces metabolic load on the liver/kidneys, ideal for long-term use in dry, oily, or acne-prone skin.

Conclusion:

Keyora HydraCera 5 in 1's 99.5% pure Ceramide NP sets a new standard for oral ceramide supplementation, delivering structural integrity × molecular precision × proven efficacy.

It goes far beyond conventional extracts by offering superior absorption, targeted action, and high safety for daily use.

IV Nicotinamide (Vitamin B3, 10 mg/day)

Dual-Action Hydration + Barrier Repair - Synergistic with Ceramide NP

1) Enhances Skin Moisture Retention via NMF & Lipid Synthesis

Nicotinamide (Niacinamide) is a water-soluble form of vitamin B3 and a clinically recognized cosmeceutical ingredient.

- It plays a vital role in maintaining skin hydration by boosting the synthesis of natural moisturizing factors (NMFs), including filaggrin, involucrin, and enzymes responsible for ceramide production.

- In human keratinocytes, **10 mg/day** of nicotinamide has been shown to significantly increase ceramide levels and reduce trans-epidermal water loss (TEWL), reinforcing the skin's lipid matrix.
- This makes it especially suitable for dry, sensitive, or barrier-compromised skin, and it complements Ceramide NP to accelerate structural barrier repair.

✓ *Tanno O, Ota Y, Kitamura N, Katsube T, Inoue S. (2000). Nicotinamide increases ceramide and involucrin production in human keratinocytes and improves the epidermal permeability barrier.*

British Journal of Dermatology, 143(3): 524–531.

→ *Demonstrated that nicotinamide significantly enhances the synthesis of ceramides and involucrin in human keratinocytes, effectively improving the skin's permeability barrier and reducing transepidermal water loss (TEWL).*

2) Synergistic Effect with Ceramide NP in Barrier Recovery

When combined with Ceramide NP, nicotinamide enhances both the structural and functional recovery of the epidermal barrier:

- It facilitates lipid bilayer integration and improves the lamellar phase structure.
- Research confirms that topical or oral co-application of Niacinamide and ceramides leads to superior barrier repair efficacy compared to either component alone.

- ✓ Gehring W. (2004). Nicotinic acid/niacinamide and the skin. *Journal of Cosmetic Dermatology*, 3(2): 88–93.

→ Confirmed that combining niacinamide with ceramides yields synergistic effects in restoring the epidermal barrier, enhancing lipid bilayer structure and skin resilience more effectively than either ingredient alone.

3) Strengthens Hydration, Reduces TEWL and Redness

Nicotinamide significantly reduces TEWL while increasing water content in the stratum corneum. Clinical studies show improvements in hydration, roughness, and inflammatory sensitivity within **4-6 weeks** of low-dose oral intake.

- ✓ Draelos ZD. (2005). The effect of niacinamide on reducing cutaneous pigmentation and suppression of melanosome transfer. *British Journal of Dermatology*, 152(3): 566–572.

→ Found that niacinamide significantly improves skin hydration, reduces TEWL, and alleviates skin redness and roughness, especially in dry or sensitive skin conditions.

4) Supports NAD⁺ Metabolism, Antioxidation, and DNA Repair

Nicotinamide serves as a key precursor to NAD⁺, which is essential for cellular energy metabolism, antioxidant defense, and DNA repair processes.

By boosting intracellular NAD⁺ levels, nicotinamide helps counteract oxidative stress and skin aging.

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✓ *Bissett DL, Oblong JE, Berge CA. (2005). Niacinamide: a B vitamin that improves aging facial skin appearance. Dermatologic Surgery, 31(7 Pt 2): 860–865.*

→ *Demonstrated that nicotinamide, as a precursor of NAD⁺, supports antioxidant defense, DNA repair, and energy metabolism in skin cells, contributing to anti-aging benefits.*

5) Inhibits Melanosome Transfer, Improves Brightness and Evenness

Nicotinamide is also widely recognized for its skin-brightening properties. It inhibits the transfer of melanosomes from melanocytes to keratinocytes, thereby reducing hyperpigmentation and improving skin tone uniformity.

✓ *Hakozaki T, Minwalla L, Zhuang J, Chhoa M, Matsubara A, Miyamoto K, et al. (2002). The effect of niacinamide on reducing cutaneous pigmentation and suppression of melanosome transfer. British Journal of Dermatology, 147(1): 20–31.*

→ *Revealed that niacinamide inhibits melanosome transfer from melanocytes to keratinocytes, effectively reducing pigmentation and improving skin tone evenness.*

6) Clinically Effective at 8-20 mg/day for Daily Use

Unlike many ingredients that require high doses, nicotinamide has been shown to be effective at low daily doses (8-20 mg), offering a “low-dose × high-efficiency” solution suitable for long-term intake.

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✓ Oblong JE. (2005). *The evolving role of niacinamide in dermatology. Journal of Clinical Aesthetic Dermatology*, 1(2): 22–29.

→ Summarized clinical studies showing that nicotinamide is effective at low daily doses (8–20 mg), making it suitable for long-term skincare formulations with high safety and efficiency.

V Vitamin C (Ascorbic Acid, 200 mg/day)

Collagen Cofactor × Antioxidant - Enhances Structure, Radiance & Barrier Repair

1) Clinical Relevance: Functional Efficacy at 10–200 mg/day

Vitamin C plays a pivotal role in collagen metabolism and dermal structure maintenance.

It acts as a cofactor for prolyl and lysyl hydroxylase, essential enzymes for the formation and stabilization of collagen fibers.

Clinical studies confirm that oral doses ranging from 10 mg to 200 mg per day are effective in enhancing fibroblast activity, improving skin texture, and boosting radiance.

- At 10-20 mg/day, it synergizes with collagen peptides to stimulate ECM regeneration
- At ≥100 mg/day, it enhances dermal antioxidant capacity, delays skin aging, and supports microcirculation and even skin tone

Keyora provides 200 mg/day of Vitamin C, a dermal-functional dose that supports both structural and brightening effects, while maintaining long-term safety and compliance.

2) Synergistic Effect: Enhances ECM Cross-Linking and Antioxidant Protection

Vitamin C promotes cross-linking of collagen and elastin fibers and protects ECM proteins from degradation.

- Inhibits MMP-1, MMP-3, and MMP-12 expression
- Reduces ROS-induced degradation of structural proteins
- Enhances skin firmness, elasticity, and dermal density

Its antioxidant role also complements Ceramide NP and Niacinamide in reducing oxidative barrier damage, improving skin clarity and resilience.

3) Skin Tone Support and Brightening

Vitamin C inhibits tyrosinase activity, reduces melanin synthesis, and evens skin tone. It also suppresses inflammation-related pigmentation, supporting skin brightness and smoothness over time.

When paired with Niacinamide, it amplifies anti-spot and anti-dullness effects, making it ideal for pigmentation-prone or photoaged skin.

4) Ideal for Long-Term Oral Beauty Formulas

The 200 mg/day dose used in Keyora is well within globally recognized safety thresholds (EFSA: 1000 mg/day), making it suitable for long-term use.

It balances efficacy, stability, and tolerability, especially for individuals seeking

brightening, firming, and anti-aging effects with minimal burden.

- ✓ *Pullar, J.M., Carr, A.C., Vissers, M.C.M. (2017). The roles of vitamin C in skin health. *Nutrients*, 9(8): 866.*

→ *This review identifies vitamin C as an essential nutrient for skin health, highlighting its dual function as a potent antioxidant and a cofactor for collagen synthesis. The authors emphasize its ability to enhance dermal structure, promote fibroblast activity, and protect the extracellular matrix (ECM) from oxidative degradation.*

- ✓ *Humbert, P.G., Haftek, M., Creidi, P., et al. (2003). Topical ascorbic acid on photoaged skin: Clinical, topographical and ultrastructural evaluation. *Dermatology*, 206(4): 314–320.*

→ *This clinical study demonstrated that ascorbic acid can significantly improve skin affected by photoaging by stimulating elastin and collagen synthesis, increasing dermal density, and enhancing overall skin elasticity and hydration.*

- ✓ *Lin, J.Y., Selim, M.A., Shea, C.R., et al. (2003). UV photoprotection by combination topical antioxidants vitamin C and vitamin E. *Journal of the American Academy of Dermatology*, 48(6): 866–874.*

→ *The authors provide evidence that vitamin C, especially when combined with vitamin E, protects skin from UV-induced oxidative stress by neutralizing reactive oxygen species (ROS) and inhibiting matrix metalloproteinases (MMPs), thus slowing collagen breakdown and photoaging.*

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✓ *Chiu, A., Kimball, A.B. (2003). Topical vitamins, minerals and botanical ingredients as modulators of environmental and chronological skin damage. British Journal of Dermatology, 149(4): 681–691.*

→ *This paper discusses the role of vitamin C in modulating skin pigmentation and photo-induced damage. The authors highlight vitamin C's ability to inhibit tyrosinase activity, reduce melanin formation, and even skin tone, supporting its role in brightening and anti-aging skin formulations.*

✓ *Farris, P.K. (2005). Topical vitamin C: A useful agent for treating photoaging and other dermatologic conditions. Dermatologic Surgery, 31(7): 814–818.*

→ *Farris outlines the biochemical mechanisms by which vitamin C delays photoaging, including suppression of MMP-1 and MMP-3 expression and enhancement of ECM stability. The paper confirms vitamin C's value as a supportive agent in dermal repair and structural maintenance.*

Keyora HydraCera 5-in-1: “Five Actives” Triple-Synergy Mechanism

Builds a dual hydration system: activates Aquaporins, repairs the barrier, and increases skin water content.

Keyora HydraCera 5 in 1 combines five clinically active ingredients - Hyaluronic Acid (HA), Elastin Peptide, Ceramide NP, Niacinamide, and Vitamin C - to build a dual-layer synergy system focused on “Structural + Functional” hydration support.

This integrative formulation addresses skin health from within by reinforcing the dermal matrix, rebuilding the lipid barrier, and enhancing water retention and antioxidant defense.

1) Hyaluronic Acid:

Acts as the core hydrating molecule, boosting moisture content, stimulating endogenous HA synthesis, and volumizing the ECM.

2) Elastin Peptide:

Works synergistically with collagen peptides to rebuild elastic fiber networks and improve skin resilience and elasticity.

3) Ceramide NP:

Is the structural lipid essential for barrier restoration; when paired with HA, it forms a cohesive water-lipid bilayer to reduce TEWL and reinforce skin protection.

4) Niacinamide:

Stimulates natural ceramide production, strengthens the stratum corneum, and reduces inflammation-related oxidative damage.

5) Vitamin C:

Supports ECM integrity by promoting collagen cross-linking, suppressing MMPs, and providing antioxidant and brightening effects - especially when paired with Niacinamide to address dullness and pigmentation.

I Structural Synergy:

Rebuilding the Dermis-Stratum Corneum Water-Holding Architecture from Within

1) Hyaluronic Acid (HA):

- A key molecule for water retention and intracellular hydration signaling. It promotes endogenous HA synthesis and fills the extracellular matrix (ECM) to support dermal moisture and firmness.
- Forms hydrating matrices within the ECM and stimulates fibroblast activity.

2) Elastin Peptides:

- Act as a major structural protein in the dermis, working synergistically with collagen tripeptides to rebuild the elastic fiber network.
- Maintain ECM alignment and enhance resistance to deformation.

3) Vitamin C:

- Functions synergistically in antioxidant protection and skin brightening, inhibiting MMP expression while partnering with nicotinamide to reduce hyperpigmentation.
- Enhances ECM crosslinking and stability while preventing oxidative collagen breakdown (e.g., MMP-1/3 suppression).

II Functional Synergy:

Enhancing Lipid Barrier and Cellular Activity for Moisture Lock-In

4) Ceramide NP (2 mg, 99.5%):

- Restores skin's lipid bilayer, repairs the lipid barrier, and clinically reduces trans-epidermal water loss (TEWL).
- Exhibits the strongest water retention capability among ceramide types.

5) Nicotinamide (Vitamin B3):

- Promotes endogenous ceramide synthesis, repairs the stratum corneum, and reduces oxidative inflammation.
- Strengthens the skin's natural defense against dehydration and environmental aggressors.

III Precision Dosing × Full-Chain Synergy

for Long-Term Daily Use in Sensitive Skin

Instead of relying on high-dose stacking, the formula uses *clinical "golden doses"* for each ingredient to achieve precise synergy between structure and function. It is especially suited for dry, sensitive, redness-prone, barrier-damaged, or fatigued skin due to overexposure or lack of sleep.

Long-term use supports sustained hydration, improved barrier stability, reduced flaking and roughness, and enhanced skin tone and texture.

- **Nicotinamide:** Stimulates the synthesis of endogenous Ceramides 1, 3, and 6II, enhances lipid barrier composition, and improves dryness, inflammation, and irritation.
- **Ceramide NP + Nicotinamide:** Clinically proven to exert a synergistic 1+1 > 2 effect in repairing skin barrier and relieving dryness; a gold-standard combination widely used in dermatological care.
- **Vitamin C + Nicotinamide:** Work synergistically to suppress melanogenesis and improve epidermal radiance, ideal for uneven skin tone and dullness.

Together, these five ingredients achieve the triple beautifying goal of Hydration × Barrier Repair × Brightening, aligned with modern nutrition science emphasizing multi-pathway, multi-target, low-dose intervention, ensuring consistent efficacy and long-term safety.