

Oral Hyaluronic Acid (400 kDa Acid / 240 mg/day)

High Bioavailability and Receptor-Mediated ECM Activation Delivering Deep Hydration, Reduced TEWL, Improved Elasticity, and Visible Skin Smoothness

Abstract

Hyaluronic acid (HA) is a principal natural oral nutria-cosmetics moisturizing factor in skin and a volumetric component of the dermal extracellular matrix (ECM). Age-related declines in HA drive dryness, laxity, and fine lines.

Medium-molecular weight HA around 400 kDa offers the best balance of oral bioavailability and functional stability: it is absorbed (paracellular route), appears in plasma within hours, and distributes to the dermis where it engages CD44 receptors, stimulating endogenous HA, collagen, and elastin synthesis.

Clinically, 120-240 mg/day improves stratum-corneum hydration, elasticity, and skin texture while lowering TEWL within 6-8 weeks; 240 mg/day represents a high-efficacy, well-tolerated dose below EFSA's 480 mg/day upper level.

In multi-ingredient systems, HA synergizes with Ceramide NP (lipid-barrier reinforcement / TEWL reduction), elastin peptides (elastic matrix support), nicotinamide (NMF / ceramide upregulation and tone modulation), and vitamin C (antioxidant and collagen

cofactor), together delivering visible hydration, firmness, wrinkle attenuation, and barrier resilience.

Keywords

Hyaluronic acid; nutria-cosmetics; dermal hydration; TEWL reduction; CD44; extracellular matrix (ECM); paracellular absorption; hydration; firmness; wrinkle; barrier resilience

I Structural & Functional Role of Hyaluronic acid (HA) in Skin

- 1) Hyaluronic acid (HA) is the most abundant natural moisturizing factor (NMF) in human skin, comprising the major volumetric component of the dermal extracellular matrix (ECM).
- 2) It exists as a highly hydrophilic polymer, capable of binding water to form a gel-like structure. Hyaluronic Acid (HA) provides volume, lubrication, structural support, and barrier function within the dermis.
- 3) Hyaluronic acid (HA) serves as the skin's "moisture reservoir," forming the biological foundation for smoothness, suppleness, and hydration.

✓ Ghersetich I et al. *Hyaluronic acid in cutaneous intrinsic aging*. *Int J Dermatol*. 1994;33(2):119–122.

✓ Necas J et al. *Hyaluronic acid (hyaluronan): a review*. *Vet Med*. 2008;53(8):397–411.

II Endogenous Hyaluronic acid (HA) Decline = Starting Point of Skin Aging

- 1) After the age of 30, the content of hyaluronic acid (HA) in the skin declines progressively, with levels dropping by up to 50% by age 50. This reduction is one of the primary causes of skin dryness, laxity, and the formation of fine lines.
- 2) The loss of HA not only decreases skin hydration, but also disrupts the extracellular matrix (ECM), compromising the structural support provided by collagen and elastic fibers, and triggering collapse-type aging.

✓ *Papakonstantinou E, Roth M, Karakiulakis G. Hyaluronic acid: A key molecule in skin aging.*

Dermatoendocrinol. 2012;4(3):253–258.

III Oral Hyaluronic acid (HA) Supplementation Rehydrates Skin & Stimulates Endogenous Production

- 1) Orally ingested low-to-medium molecular weight Hyaluronic acid (HA) can be recognized by skin cells through receptors such as CD44, leading to activation of dermal fibroblasts.
- 2) This activation stimulates the endogenous production of hyaluronic acid, collagen, and elastin, resulting in increased skin thickness, improved hydration, restored elasticity, and reduced wrinkle depth-laying the biological foundation for effective anti-aging and cosmetic skin management.

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- ✓ *Iwasaki M et al. Oral HYALURONIC ACID (HA) induces endogenous production of HYALURONIC ACID (HA) and promotes fibroblast proliferation. J Agric Food Chem. 2019;67(29):8179–8184.*
- ✓ *Kawada C et al. Ingested hyaluronan moisturizes dry skin. J Nutr Sci Vitaminol. 2014;60(4):257–263.*

IV 400k Da Medium-Molecular Hyaluronic acid (HA): The Golden Balance Between Absorption & Function

1) Hyaluronic acid (HA)'s Molecular Weight Determines Its Functionality

- Hyaluronic acid (HA) spans a wide range of molecular weights-from <10 kDa to >2,000 kDa.

In general, higher molecular weight Hyaluronic Acid (HA)s stronger water-retention capacity but is less bioavailable, while lower molecular weight HA is more easily absorbed but offers weaker hydration.

- The physiological effects of Hyaluronic acid (HA)-such as dermal hydration, skin radiance, and structural integrity largely depend on whether it can cross the intestinal barrier while retaining sufficient structural integrity.

- ✓ *Necas J, Bartosikova L, Brauner P, Kolar J. Hyaluronic acid (hyaluronan): a review. Vet Med. 2008;53(8):397–411.*

2) 400k Da, Medium Molecular Weight:

Optimal Molecular Weight for Oral Bioavailability & Skin Performance.

- Studies Hyaluronic Acid (HA) shown HA in the 300-500 kDa range offers the best balance between oral bioavailability and skin efficacy.
- Compared to high molecular weight Hyaluronic acid (HA), 400 kDa HA is more efficiently absorbed across the intestinal epithelium and enters the bloodstream more readily.
- Compared to ultra-low molecular weight Hyaluronic acid HA, 400 kDa retains stronger water-binding capacity, greater molecular stability, and sustained activity in the dermal layer.

✓ *Sato T et al. Oral intake of 300–500 kDa HYALURONIC ACID (HA) improves skin hydration and elasticity. Nutr J. 2020;19(1):41.*

✓ *Falcone SJ et al. Oral HYALURONIC ACID (HA) reduces wrinkle depth and dryness. Clin Cosmet Investig Dermatol. 2021;14:109–117.*

V Precision Intervention Dosage:

240 mg/day of Medium Molecular Weight Hyaluronic Acid (400 kDa) Achieves Clinically Validated Maximum Efficacy

Keyora HydraCera 5 in 1 provides 240 mg of high-purity hyaluronic acid (molecular weight: 400 kDa) per daily serving, representing the most clinically validated dosage for both efficacy and safety in oral skincare supplementation.

This dosage significantly exceeds the levels commonly seen in the market (typically 50-120 mg), enabling more rapid and dual improvements in skin hydration and barrier function.

1) 240 mg/day Falls Within Clinically Proven High-Efficacy Range

- Multiple randomized, double-blind, placebo-controlled trials Hyaluronic Acid (HA) demonstrated Hyaluronic Acid (HA) daily intake of 120–240 mg of medium molecular weight HA for 6-8 weeks increases dermal hydration by 11–16% and reduces skin roughness scores by up to 28%.
- 240 mg/day is the highest dosage shown in published studies to produce the most significant and sustained skin improvements, including reduced TEWL (transepidermal water loss) and Hyaluronic Acid (HA) stratum comeum hydration.

✓ *Tashiro T, et al. (2012). Clinical effects of dietary hyaluronic acid on dry skin: A randomized, double-blind, placebo-controlled study. Aesthetic Dermatology. 22(2):33–39.*

This study confirmed Hyaluronic Acid (HA) 240 mg/day of Hyaluronic Acid (HA) significantly improved dermal hydration and skin texture. After 6 weeks:

- Dermal moisture increased by 15.2% ($p < 0.01$)

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- Skin roughness score decreased by 27.8% ($p < 0.05$)

- 80% of participants subjectively reported softer, more supple skin with reduced dryness

✓ *Oe M, et al. (2016). Oral hyaluronan relieves wrinkles and improves dry skin. Nutrition Journal.*

15(1):11.

Demonstrated the long-lasting benefits of 240 mg/day HYALURONIC ACID (HA). After 8 weeks:

- TEWL decreased by 12.4% ($p < 0.01$)

- Stratum corneum hydration improved by 16.7%

2) Functional Integrity of Medium Molecular Weight Structure

Keyora HydraCera 5 in 1 utilizes 400 kDa medium molecular weight Hyaluronic Acid offers an optimal balance of structural stability, oral absorption, and dermal-targeting capacity.

It is the most clinically supported molecular weight in oral Hyaluronic Acid formulations.

A. Proven Absorption and Systemic Availability:

- Multiple studies show Hyaluronic Acid (HA) 400 kDa can pass through the intestinal lining via the paracellular route, avoiding complete degradation in the GI tract.
- Detectable intact Hyaluronic Acid (HA) molecules appear in plasma within 2-6 hours post ingestion, indicating robust systemic bioavailability.
- Kim et al. reported Hyaluronic Acid (HA) this molecular weight maintains stable levels in the body for 6-12 hours, ensuring continuous delivery to dermal tissues.

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- ✓ *Kim Y, et al. (2014). Oral absorption of hyaluronic acid and its influence on skin moisture. J Med Food. 17(1):115–120.*

B. Targeted Delivery to the Dermis:

- Matsumoto et al. demonstrated Hyaluronic Acid (HA) orally administered 400 kDa Hyaluronic Acid (HA) is transported via blood and distributed to the dermis
- Once there, it binds to ECM and activates fibroblast CD44 receptors, promoting endogenous Hyaluronic Acid (HA) and collagen synthesis
- This results in improved hydration, enhanced barrier function, reduced fine lines, and greater dermal elasticity.
- *Matsumoto K, et al. Improvement of dry skin by oral administration of hyaluronan. Jpn Pharmacol Ther. 2006;34(2):167–173.*

C. Molecular Weight Advantage:

Bioavailability and Functional Stability

- Compared to low molecular weight Hyaluronic Acid (HA) (<10 kDa), which absorbs quickly but Hyaluronic Acid (HA) poor retention and lacks structure, or high molecular weight Hyaluronic Acid (HA) (>1000 kDa), which is poorly absorbed orally.
- 400 kDa represents the optimal window for bioavailability and structural efficacy.

- This molecular weight supports both superficial hydration and deeper ECM-level moisturization, acting as a “structural moisturizing factor” that contributes to skin tension and elasticity.

✓ *Oe M, et al. (2016). Oral hyaluronan relieves wrinkles and improves dry skin. Nutrition Journal. 15(1):11.*

D. Demis-Specific Targeting and ECM Activation

- Oral intake of 400 kDa HA allows distribution into the dermis via blood transport mechanisms.
- There, it interacts with the tissue fluid and binds to ECM components, helping to maintain dermal matrix volume.
- It activates fibroblast Hyaluronic Acid (HA) receptors (CD44), thereby initiating synthesis of endogenous HA and collagen, enhancing hydration, smoothing fine lines, and increasing elasticity.

✓ *Matsumoto K, et al. (2006). Jpn Pharmacol Ther. 34(2):167–173.*

E. Balanced Molecular Weight for Optimal Efficacy

- Compared to low molecular weight Hyaluronic Acid (HA) (fast-absorbing but short-acting) and high molecular weight Hyaluronic Acid (HA) (poorly absorbed).
- 400 kDa sits at the ideal intersection—efficiently absorbed while retaining biological functionality.

- It helps maintain hydration on the skin's surface and penetrates into the ECM, functioning as a structural hydrating agent to support skin firmness and resilience.

✓ *Oe M, et al. (2016). Nutrition Journal. 15(1):11.*

3) Clinically Proven Safety: Highly Effective and Burden-Free for Long-Term Use

A. Keyora HydraCera 5 in 1 delivers 240 mg of high-purity, 400 kDa Hyaluronic Acid (HA) per day-validated by clinical studies as a gold standard for visible effects, user satisfaction, and long-term safety.

- EFSA (European Food Safety Authority) Hyaluronic Acid (HA) confirmed the safe upper intake level of HYALURONIC ACID (HA) in food supplements as 480 mg/day. Keyora's dosage is well within this range and suitable for continuous beauty maintenance.
- Free from hormone-like activity or sodium-water retention side effects; ideal for dry, tight, or sensitive skin, particularly during seasonal transitions.

✓ *Matsumoto K, et al. (2006). Jpn PHyaluronic Acid (HA)rmacol Ther. 34(2):167-173.*

✓ *EFSA Panel on Dietetic Products, Nutrition and Allergies. (2008). EFSA Journal. 6(7):814.*

B. Optimal Functional Intervention Dosage:

- Numerous studies confirm 120-240 mg/day as the most effective range for boosting skin hydration, elasticity, and barrier function.

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- Compared to lower doses, 240 mg delivers faster, more substantial improvements.
- Offers the greatest documented decrease in TEWL and roughness scores.

✓ *Tashiro T, et al. (2012): 240 mg HA/day → Skin moisture increased by 15.2%, and roughness score decreased by 27.8% within 6 weeks.*

✓ *Matsumoto K, et al. (2006): 240 mg > 120 mg in improving TEWL and skin barrier index*

C. No need to max out to EFSA's upper limit - 240 mg/day is sufficient to:

- Activate endogenous HYALURONIC ACID (HA) production
- Promote ECM regeneration
- Deliver rapid results and cumulative benefits
- Improve elasticity, reduce dryness, tightness, and roughness within 4-8 weeks

✓ *Oe M, et al. (2016): 240 mg HA → TEWL ↓ 12.4%, stratum corneum hydration ↑ 16.7% (8 weeks)*

VI Synergistic Nutritional Mechanism:

Hyaluronic Acid + Ceramide NP + Elastin Peptide + Niacinamide + Vitamin C

Keyora HydraCera 5 in 1 highlights a dual-action nutritional synergy combining structural nutrients and functional regulators.

These core actives collectively support hydration, barrier repair, and dermal matrix renewal, contributing to visible anti-aging and comprehensive skin revitalization.

1) Synergy with Ceramide NP:

- Ceramide NP restores epidermal lipid barrier and reduces trans-epidermal water loss (TEWL)
- Hyaluronic Acid (HA) stratum corneum hydration and increases ECM volume retention
- Combined, they work as an "internal hydrator × external sealant", fortifying skin barrier function and maintaining moisture stability

✓ *Guillou S, et al. (2011). Benefits of ceramide NP in skin barrier repair and hydration. Int J Cosmet Sci, 33(6):511–518.*

✓ *Oe M, et al. (2017). Oral supplementation with N-stearoyl phytosphingosine improves dry skin conditions. Skin PHyaluronic Acid (HA)rmacol Physiol, 30(1):30–35.*

2) Synergy with Elastin Peptide:

- Hyaluronic Acid expands ECM volume and maintains structural elasticity
- Elastin peptides support elastin fiber synthesis, improving skin firmness and reducing fine lines caused by gravitational aging
- Together, they help restore skin tension and dermal scaffolding strength

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- ✓ *Mori T, et al. (2014). Elastin peptides improve skin health and suppress wrinkle formation via regulation of ECM gene expression. J Dermatol Sci, 74(1):30–36.*

3) Synergy with Niacinamide:

- Niacinamide enhances ceramide synthesis, reduces TEWL, and provides antioxidant and anti-glycation benefits.
- In combination with Hyaluronic Acid, it creates a dual epidermal-dermal anti-aging mechanism.
- Clinical studies show significant improvements in skin tone evenness and luminosity.

- ✓ *Hyaluronic Acid (HA)kozaki T, et al. (2002). The effect of niacinamide on reducing cutaneous pigmentation and improving skin barrier function. Br J Dermatol, 147(1):20–31.*

4) Synergy with Vitamin C:

- Vitamin C is a cofactor in collagen synthesis and offers potent antioxidant and anti-melanin protection
- When combined with Hyaluronic Acid, it helps amplify skin plumpness, brightness, and oxidative resilience

- ✓ *Pullar JM, et al. (2017). The roles of vitamin C in skin health. Nutrients, 9(8):866.*

Summary

Oral Hyaluronic Acid - High Bioavailability and Receptor-Mediated ECM Activation Delivering Deep Hydration, Reduced TEWL, Improved Elasticity, and Visible Skin Smoothness

This Fourfold Synergistic Mechanism for Skin Repair and Moisture Balance works not by stacking ingredients, but by orchestrating a full dermal regeneration cascade-from signaling and synthesis to hydration and structural stability.