

RESEARCH MONOGRAPH . COMPOUND PROFILE

Matrixyl 3000

A topical cosmetic blend of two palmitoylated matrikine peptides, palmitoyl tripeptide-1 (Pal-GHK) and palmitoyl tetrapeptide-7 (Pal-GQPR), formulated for collagen synthesis stimulation in cosmetic anti-aging applications.

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ABSTRACT

Matrixyl 3000 is a cosmetic ingredient blend developed by the French company Sederma (Croda) consisting of two palmitoylated matrikine peptides: palmitoyl tripeptide-1 (Pal-Gly-His-Lys; Pal-GHK; molecular weight approximately 578 Da; the palmitoylated version of the well-characterized matrikine GHK that is the basis of GHK-Cu, KDC-MN-007) and palmitoyl tetrapeptide-7 (Pal-Gly-Gln-Pro-Arg; Pal-GQPR; molecular weight approximately 619 Da). The matrikine concept describes short bioactive peptides released by enzymatic degradation of extracellular matrix proteins (collagens, elastin, laminin) that signal to dermal fibroblasts to repair the matrix; the matrikine signal is interpreted as a tissue-damage marker that drives compensatory matrix synthesis. GHK is the canonical collagen-promoting matrikine; the GQPR sequence is derived from immunoglobulin and inhibits IL-6-induced inflammatory cytokine production. The palmitoylation of both peptides anchors them in the lipid bilayer of the stratum corneum, substantially improving topical retention relative to the unmodified peptides and providing sustained cutaneous delivery. The pharmacological argument for the blend over either peptide alone is the dual mechanism: collagen synthesis stimulation through GHK signaling combined with anti-inflammatory and matrix-protective signaling through GQPR. Published manufacturer-sponsored studies report measurable increases in skin firmness, reduced wrinkle depth, and improved skin tone at 8 weeks of twice-daily topical application of 3 percent or 4 percent Matrixyl 3000 solutions. Independent academic replication is limited. The blend is sold as a cosmetic ingredient (not a regulated drug) in essentially all major cosmetic markets. Distinct from the

original Matrixyl (palmitoyl pentapeptide-4, also known as Pal-KTTKS), which is a separate Sederma matrikine ingredient.

1. Compound Identification

Matrixyl 3000 is described as matrikine cosmetic peptide blend (pal-ghk and pal-gqpr). A topical cosmetic blend of two palmitoylated matrikine peptides, palmitoyl tripeptide-1 (Pal-GHK) and palmitoyl tetrapeptide-7 (Pal-GQPR), formulated for collagen synthesis stimulation in cosmetic anti-aging applications.

1.1 Class summary

Matrikine cosmetic peptide blend (Pal-GHK and Pal-GQPR)

1.2 Subtitle

A topical cosmetic blend of two palmitoylated matrikine peptides, palmitoyl tripeptide-1 (Pal-GHK) and palmitoyl tetrapeptide-7 (Pal-GQPR), formulated for collagen synthesis stimulation in cosmetic anti-aging applications.

2. Abstract

Matrixyl 3000 is a cosmetic ingredient blend developed by the French company Sederma (Croda) consisting of two palmitoylated matrikine peptides: palmitoyl tripeptide-1 (Pal-Gly-His-Lys; Pal-GHK; molecular weight approximately 578 Da; the palmitoylated version of the well-characterized matrikine GHK that is the basis of GHK-Cu, KDC-MN-007) and palmitoyl tetrapeptide-7 (Pal-Gly-Gln-Pro-Arg; Pal-GQPR; molecular weight approximately 619 Da). The matrikine concept describes short bioactive peptides released by enzymatic degradation of extracellular matrix proteins (collagens, elastin, laminin) that signal to dermal fibroblasts to repair the matrix; the matrikine signal is interpreted as a tissue-damage marker that drives compensatory matrix synthesis. GHK is the canonical collagen-promoting matrikine; the GQPR sequence is derived from immunoglobulin and inhibits IL-6-induced inflammatory cytokine production. The palmitoylation of both peptides anchors them in the lipid bilayer of the stratum corneum, substantially improving topical retention relative to the unmodified peptides and providing sustained cutaneous delivery. The pharmacological argument for the blend over either peptide alone is the dual mechanism: collagen synthesis stimulation through GHK signaling combined with anti-inflammatory and matrix-protective signaling through GQPR. Published manufacturer-sponsored studies report measurable increases in skin firmness, reduced wrinkle depth, and improved skin tone at 8 weeks of twice-daily topical application of 3 percent or 4 percent Matrixyl 3000 solutions. Independent academic replication is limited. The blend is sold as a cosmetic ingredient (not a regulated drug) in essentially all major cosmetic markets. Distinct from the original Matrixyl (palmitoyl pentapeptide-4, also known as Pal-KTTKS), which is a separate Sederma matrikine ingredient.

3. Mechanism of Action

Pal-GHK: matrikine signal to dermal fibroblasts driving collagen, elastin, and glycosaminoglycan synthesis. Pal-GQPR: anti-inflammatory and matrix-protective signaling. Palmitoylation anchors peptides in stratum corneum for sustained topical delivery.

The mechanistic profile described above represents the consensus position from peer-reviewed literature where available; for compounds with sparse formal characterization, this section reflects vendor-grade reports and structurally-related class pharmacology and should be interpreted with appropriate caution.

4. Pharmacokinetics and Routes of Administration

Pharmacokinetic data are summarized within the abstract for compounds with formal Phase 1 records. Compounds without published human pharmacokinetic studies are noted as such; investigators should treat the absence of data as a research limitation.

5. Reported Research Dose Ranges

Topical 3 to 4 percent Matrixyl 3000 solution applied to skin twice daily in cosmetic formulations.

Doses are scaled from clinical use where the compound is approved as a medicine, from Phase 2/3 trials where development advanced, or from rodent dose-response data scaled by allometric assumptions where the compound has no human clinical record. Investigators should treat dose ranges from research-chemical-grade vendors as starting points for their own pharmacokinetic and tolerability characterization rather than validated dosing recommendations.

6. Sourcing and Quality Verification

Investigators should obtain analytical confirmation of identity (mass spectrometry; for peptides, additionally amino acid analysis or N-terminal sequencing) and purity (HPLC area-percent, ideally greater than 95 percent) on every lot. Vendor certificates of analysis vary in quality; third-party analytical confirmation through independent laboratories (e.g., Janoshik Analytical, Anabolic Lab) is the gold standard for research-grade peptides and small molecules.

For compounds with established pharmaceutical-grade marketing in any jurisdiction, sourcing from the marketed product (where legal and accessible) provides the highest quality assurance.

7. Reconstitution and Handling

Peptides should be reconstituted in bacteriostatic water or sterile water for injection in the volume appropriate to the desired concentration; lyophilized peptides should be allowed to come to room temperature before reconstitution to minimize precipitation. Reconstituted peptides should be stored refrigerated and used within the timeframe specified by the manufacturer (typically 14 to 30 days for bacteriostatic water reconstitutions, shorter for sterile water).

Small molecules: storage conditions vary by compound; consult the certificate of analysis for the specific product. Most are stable at room temperature in dry, dark conditions; oxidation-sensitive compounds (e.g., catecholamine precursors) require cool storage and protection from light.

8. Stack Interaction Considerations

Investigators combining this compound with other research substances should consider receptor-level interactions (additive effects at shared targets), enzyme-level interactions (CYP-mediated drug-drug interactions where applicable), and pharmacodynamic interactions (additive sedation, additive serotonergic activity, additive hemodynamic effects).

The stack interaction section in published monographs of well-characterized compounds is necessarily incomplete for any specific combination; investigators should treat novel combinations with elevated caution and titrate gradually.

9. References

1. Robinson LR, et al. Topical palmitoyl pentapeptide provides improvement in photoaged human facial skin. Int J Cosmet Sci 2005.
2. Pickart L, et al. The human tripeptide GHK-Cu in prevention of oxidative stress and degenerative conditions. Biomed Res Int 2014.
3. Aldag C, et al. Skin rejuvenation using cosmetic products containing growth factors, cytokines, and matrikines. Clin Cosmet Investig Dermatol 2016.

This monograph is provided for research use only. Not for medical, diagnostic, or therapeutic purposes. Not for human consumption. Compound class generalizations are noted where compound-specific data are sparse; investigators should weight the evidence accordingly.