

# GHK-Cu

**Harriman Precision  
Health**

COPPER PEPTIDE — PATIENT EDUCATION GUIDE  
— REGENERATIVE & ANTI-AGING THERAPY

Physician-Supervised  
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## What Is GHK-Cu?

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GHK-Cu (Glycyl-L-Histidyl-L-Lysine-Copper) is a naturally occurring tripeptide-copper complex found in human plasma, saliva, and urine. It was first isolated in 1973 by researcher Dr. Loren Pickart, who discovered that plasma from young donors caused older liver cells to begin producing proteins characteristic of younger tissue — and identified GHK as the active signaling molecule responsible.<sup>1,2</sup> This finding established GHK-Cu as one of the first documented examples of a biological molecule capable of resetting aging tissue toward more youthful patterns of function.

GHK-Cu levels decline significantly with age — from approximately 200 ng/mL in early adulthood to under 80 ng/mL by age 60.<sup>3</sup> This decline closely tracks the visible and functional changes associated with aging: reduced skin elasticity, slower wound healing, thinning hair, and decreased tissue repair capacity. Therapeutic GHK-Cu aims to restore these levels and reactivate the repair signaling pathways that age progressively suppresses.

**What makes GHK-Cu unique:** *Unlike most peptides that target a single pathway, GHK-Cu has been shown to influence over 4,000 human genes — upregulating genes associated with tissue repair and regeneration while simultaneously downregulating genes linked to inflammation, fibrosis, and cellular breakdown.<sup>4</sup> It is, at its core, a master repair signal that your body already knows how to use.*

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## How It Works

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GHK-Cu works by binding copper ions and acting as a multifunctional signaling molecule that activates several overlapping biological pathways simultaneously.<sup>5</sup> Its copper-chelating properties are central to its activity —

copper serves as a cofactor for the enzymes responsible for collagen crosslinking, antioxidant defense (superoxide dismutase), and angiogenesis. The primary mechanisms include:

**Collagen and elastin stimulation:** GHK-Cu activates fibroblasts to produce Type I and Type III collagen, directly improving skin firmness, wound tensile strength, and dermal thickness. It also stimulates elastin synthesis while protecting existing elastic fibers from degradation.<sup>6</sup> **Gene expression modulation:** Research has documented GHK-Cu's ability to reset the gene expression profile of aged cells toward patterns more characteristic of younger, healthier tissue — affecting pathways governing growth, repair, inflammation, and metabolic function.<sup>4,7</sup> **Antioxidant and anti-inflammatory activity:** GHK-Cu enhances natural antioxidant defense mechanisms and modulates inflammatory cytokine production, reducing the chronic low-grade inflammation that accelerates tissue aging.<sup>8</sup> **Angiogenesis and hair follicle activation:** GHK-Cu promotes new blood vessel formation and activates Wnt signaling in dermal papilla cells — a key pathway governing the anagen (active growth) phase of the hair cycle.<sup>9,10</sup>

## What GHK-Cu Is Used For

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### **Skin Rejuvenation & Anti-Aging**<sup>6,7</sup>

Reduces wrinkles, fine lines, and skin laxity. Improves firmness, elasticity, hydration, and overall skin quality. Clinical studies have measured 20–30% improvements in skin firmness after 12 weeks. Addresses photodamage, uneven pigmentation, and age-related dermal thinning.

### **Hair Restoration**<sup>9,10</sup>

Counteracts follicular miniaturization seen in androgenetic alopecia. Increases follicle size, improves scalp blood supply through angiogenesis, and prolongs the hair growth cycle. Particularly effective for thinning hair and weakened follicles. Non-hormonal and compatible with minoxidil or finasteride.

### **Wound Healing & Tissue Repair**<sup>11,12</sup>

Research has documented 40–50% acceleration in wound closure compared to controls. Supports healing of surgical incisions, traumatic wounds, and chronic wounds. Reduces scar formation and improves tissue architecture quality. Valuable post-procedure

### **Longevity & Systemic Regeneration**<sup>3,4</sup>

Addresses the age-related decline in tissue repair signaling. Supports extracellular matrix integrity, antioxidant defense, and anti-fibrotic activity throughout the body. Increasingly used as a foundational longevity peptide alongside NAD+ for patients

(microneedling, laser, chemical peel, surgery).

focused on healthy aging and tissue preservation.

## GHK-Cu Levels and the Aging Connection

Age Range	Approximate Plasma GHK-Cu Level	Associated Changes
Age 20–30	~200 ng/mL	Peak tissue repair capacity, optimal skin elasticity, strong hair density
Age 40–50	~140 ng/mL	Visible skin changes begin, slower wound healing, early follicle miniaturization
Age 60+	<80 ng/mL	Significant reduction in collagen production, pronounced skin laxity, accelerated hair thinning

Therapeutic GHK-Cu supplementation aims to restore plasma and tissue levels toward the ranges associated with active repair and regenerative capacity.<sup>3</sup>

## What to Expect: Timeline of Results

GHK-Cu results are gradual, cumulative, and build meaningfully over a full treatment cycle. Most patients notice early improvements in skin texture and hydration — a subtle but noticeable improvement in overall skin quality — within the first two to four weeks.<sup>13</sup> By weeks six through eight, more visible changes in firmness, fine lines, and skin tone typically emerge as collagen production accelerates. Hair quality improvements — thicker texture, reduced shedding, improved scalp health — tend to become apparent around weeks four to eight, with more significant density changes developing over two to three complete cycles in patients using GHK-Cu specifically for hair restoration.<sup>9</sup> Wound healing and post-procedure recovery benefits are typically the fastest to appear, often within one to two weeks of initiation for patients using GHK-Cu as part of an aesthetic recovery protocol.

## Standard Protocol

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Parameter	Details
<b>Dose</b>	1–2 mg per day (individualized by your physician)
<b>Route</b>	Subcutaneous injection (abdominal fat pad); topical application as a complementary adjunct for skin and scalp goals
<b>Frequency</b>	Once daily
<b>Cycle Structure</b>	30 days on / 30 days off — standard cycling protocol to maintain receptor sensitivity and optimize efficacy
<b>Typical Duration</b>	2–3 cycles (3–6 months) for skin and hair goals; ongoing cycling for longevity protocols
<b>Medication Source</b>	Compounded by Empower Pharmacy (Houston, TX) — licensed compounding partner

All protocols are individualized by your supervising physician. GHK-Cu stacks well with NAD+, BPC-157, and CJC-1295/Ipamorelin for patients pursuing comprehensive anti-aging or regenerative programs.

## Safety Profile

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GHK-Cu has an excellent safety profile and represents one of the most extensively studied peptides in both clinical and cosmetic research, with decades of human use data in topical applications.<sup>5</sup> It is not a hormone, does not affect the HPG axis, and does not require post-cycle therapy. It is not a controlled substance. Side effects are minimal — the most commonly reported is brief, mild injection site redness that resolves quickly. No significant systemic adverse events have been documented at therapeutic doses.<sup>12</sup>

The primary clinical contraindication is active malignancy. Because GHK-Cu promotes cell growth and tissue repair signaling, it could theoretically support cancer cell proliferation in patients with active cancer, and should not be used in this population without oncology consultation.<sup>13</sup> Patients with a history of hormone-sensitive cancers should also discuss this with their physician prior to initiating. GHK-Cu is not recommended during pregnancy or breastfeeding due to insufficient safety data in these

populations.

## How to Maximize Your Results

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GHK-Cu restores a repair signal your body already uses — giving it the right environment to work in makes a meaningful difference in outcomes, particularly for skin quality and hair restoration goals.

### Evidence-Informed Optimization Strategies

- › **Collagen + Vitamin C (Morning)**<sup>14,15</sup> — GHK-Cu drives fibroblast activation and collagen synthesis — but collagen production requires both the amino acid substrate (from collagen peptides or protein) and vitamin C for enzymatic cross-linking. Taking 10–15 g of hydrolyzed collagen with 500–1,000 mg of vitamin C each morning provides the direct building blocks your skin and connective tissue need to respond fully to GHK-Cu's signaling. This combination is particularly powerful for patients using GHK-Cu for skin rejuvenation and anti-aging goals.
- › **Zinc and Copper Balance**<sup>5</sup> — GHK-Cu's mechanism depends on copper as a cofactor for key repair enzymes. While the peptide delivers copper directly, maintaining adequate dietary zinc is also important — zinc is essential for wound healing, collagen enzyme function, and skin cell turnover. Avoid excessive zinc supplementation (>50 mg/day) during your cycle, as very high zinc intake can compete with copper absorption. A balanced multivitamin covering both minerals at standard doses is ideal.
- › **Sun Protection**<sup>7</sup> — GHK-Cu actively works to reverse photodamage and improve skin quality — but continued UV exposure undermines that work in real time. Daily SPF 30+ is essential during your cycle. UV radiation accelerates collagen breakdown and oxidative damage to the very structures GHK-Cu is rebuilding. This is especially important for patients using GHK-Cu for anti-aging and skin rejuvenation goals.
- › **Adequate Protein Intake**<sup>16</sup> — Collagen and elastin are proteins. Producing more of them requires amino acid substrate from your diet. Target 0.7–1.0 g of protein per pound of body weight daily. Glycine-rich sources — collagen peptides, bone broth, chicken skin

— provide the specific amino acid that is rate-limiting for collagen synthesis.

- › **Prioritize Sleep**<sup>17</sup> — Cellular repair and collagen production peak during deep sleep. Growth hormone release during slow-wave sleep directly amplifies GHK-Cu's regenerative signaling. Target 7–9 hours per night. Chronic sleep deprivation is one of the fastest ways to accelerate the skin aging GHK-Cu is working to reverse.
- › **Scalp Stimulation (for Hair Goals)** — For patients using GHK-Cu specifically for hair restoration, regular scalp massage (5–10 minutes daily) and microneedling of the scalp (with provider guidance) improve local circulation and enhance peptide delivery to follicles. GHK-Cu pairs particularly well with post-microneedling application — both topically and systemically — due to its wound healing and follicle activation properties.<sup>10</sup>
- › **Anti-Inflammatory Diet and Antioxidants**<sup>8</sup> — Chronic oxidative stress and inflammation are two of the primary drivers of skin aging and follicular decline. GHK-Cu's antioxidant signaling is amplified when supported by a diet rich in antioxidants — berries, leafy greens, green tea, and omega-3 fatty acids. Minimize processed foods, excess sugar, and alcohol, which accelerate glycation and inflammatory aging of skin tissue.
- › **Avoid Smoking** — Smoking is one of the most potent accelerants of skin aging, causing oxidative damage, reduced skin blood flow, and direct impairment of collagen synthesis — working directly against every mechanism GHK-Cu is activating. Patients who smoke will see substantially reduced outcomes from GHK-Cu therapy.

## Frequently Asked Questions

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### ***Is GHK-Cu just a skincare ingredient, or is it more than that?***

GHK-Cu is widely used in topical skincare, but framing it purely as a cosmetic ingredient misses the broader biology. At the clinical injectable dose used in our program, GHK-Cu operates as a systemic repair signal — influencing thousands of genes related to tissue remodeling, inflammation, and cellular regeneration throughout the body. Topical use provides surface-level benefits; physician-supervised injectable therapy works at a

fundamentally deeper level.<sup>4,7</sup>

### ***Why is there a 30-day on / 30-day off cycling structure?***

The 30/30 cycling protocol is the standard used by leading peptide therapy clinics and is designed to maintain receptor sensitivity and optimize long-term efficacy. Continuous use without cycling can lead to receptor downregulation, reducing the peptide's effectiveness over time. The rest period also allows the body to consolidate the repair processes initiated during the active phase.<sup>13</sup>

### ***Can I combine GHK-Cu with my TRT or GLP-1 program?***

Yes. GHK-Cu is fully compatible with testosterone replacement therapy and GLP-1 programs. TRT's effects on skin quality, collagen production, and hair density are complementary to GHK-Cu's mechanisms. Many patients find that combining GHK-Cu with their TRT program produces noticeably better skin and hair outcomes than either therapy alone.

### ***How long until I see results for hair restoration specifically?***

Hair restoration is a slower process than skin rejuvenation because the hair growth cycle itself takes time. Most patients notice reduced shedding and improved hair texture within four to eight weeks. Meaningful density improvements typically require two to three full cycles (three to six months). Consistency and cycle completion are critical — stopping early is the most common reason for suboptimal hair outcomes.

### ***How is my medication sourced?***

All peptides are compounded by Empower Pharmacy, our licensed Houston-based compounding pharmacy partner, under strict quality and sterility standards.

**Important Notice:** This document is for educational purposes only and does not constitute medical advice. All therapies at Harriman Precision Health are physician-supervised and protocols are individualized to your health history and goals. Results may vary. GHK-Cu is an off-label compounded therapy. Patients with active malignancy, a history of hormone-sensitive cancers, or who are pregnant or breastfeeding should discuss this with their physician prior to initiating. This material should not be used for self-diagnosis or self-treatment. Questions? Contact us through your patient portal.

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*injectable systemic applications represent an emerging and evolving area of clinical practice. All therapies at Harriman Precision Health are physician-supervised, used off-label, and protocols are individualized to each patient's health history and goals. This document does not constitute a guarantee of clinical outcomes.*

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