

## GHK-Cu and Topical Estriol: Benefits for Skin Health, Healing, and Anti-Aging

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### What is GHK-Cu?

GHK-Cu is a naturally occurring **tripeptide** found in plasma, saliva, and urine. It plays a key role in tissue regeneration, collagen production, and wound healing.

- **Levels at age 20:** ~200 ng/mL
- **Levels at age 60:** ~80 ng/mL (linked to decreased regenerative capacity)

Discovered in 1973 by Dr. Pickart, GHK was identified as a molecule that helps aged human liver tissue synthesize proteins as efficiently as younger tissue.

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### GHK-Cu Effects on Skin and Wound Healing

- Accelerates wound healing and improves the success of skin grafts.
- Reduces inflammation and supports antioxidant enzyme production.
- Stimulates collagen, glycosaminoglycan, and proteoglycan production, including dermatan sulfate, chondroitin sulfate, and decorin.
- Improves healing of diabetic, ischemic, and other chronic wounds in animal models (rats, mice, pigs, dogs).
- Promotes blood vessel formation to support tissue repair.

### Skin Health and Anti-Aging Effects

Clinical studies confirm GHK-Cu's effectiveness in improving skin quality:

1. Tightens loose skin, reverses thinning, and improves elasticity.
  2. Increases skin density, clarity, and firmness.
  3. Reduces fine lines and deep wrinkles.
  4. Protects against UV damage and reduces hyperpigmentation.
  5. Increases keratinocyte proliferation, promoting healthy skin cell renewal.
  6. Boosts hair growth by increasing hair follicle size and thickness.
  7. Lengthens and thickens eyelashes.
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### GHK-Cu Research in Cosmetic Products

- Collagen production improved in 70% of women treated with GHK-Cu cream compared to 50% for vitamin C and 40% for retinoic acid creams.
- A 12-week facial study of 71 women with photoaged skin found that GHK-Cu improved skin laxity, reduced fine lines, wrinkles, and pigmentation, and increased skin density.

- Eye cream study: GHK-Cu outperformed both placebo and vitamin K eye creams, reducing wrinkles and improving skin thickness.

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### Additional Health Benefits of GHK-Cu

- Restores vitality to cells damaged by radiation therapy.
- Attracts immune and endothelial cells to injury sites, accelerating healing.
- Potential therapeutic applications for COPD, skin inflammation, and colon cancer.
- Regulates over 4,000 genes, resetting DNA expression to a healthier state.

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### What is Topical Estriol (E3)?

Estriol is one of the three estrogens produced by the body and plays a critical role in skin aging.

- Estrogen loss after menopause leads to dryness, fine wrinkles, poor wound healing, and collagen loss.

### Benefits of Topical Estriol for Skin Health

1. Improves elasticity and firmness.
2. Reduces wrinkles and shrinks pore size.
3. Increases skin moisture and promotes collagen production.
4. Elevates hyaluronic acid levels, helping skin retain hydration.
5. Supports sebum secretion, enhancing moisture retention.

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### Example of GHK-Cu Healing Properties

Our medical director, Michelle, used **injectable GHK-Cu** daily for one month before surgery to remove skin cancer from the nose and continued with topical GHK-Cu after surgery. A skin graft was placed, and despite concerns about the skin's mobility, the graft successfully took. The photos showed **remarkable healing progress**, demonstrating the peptide's powerful regenerative capabilities.



Skin Cancer Removal Skin graft in place



One week post-op Two weeks post-op Three weeks post-op

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### Possible Side Effects

GHK-Cu (Copper Tripeptide-1) is generally considered safe when administered at appropriate doses, but like many compounds, it can have side effects. Some potential side effects include:

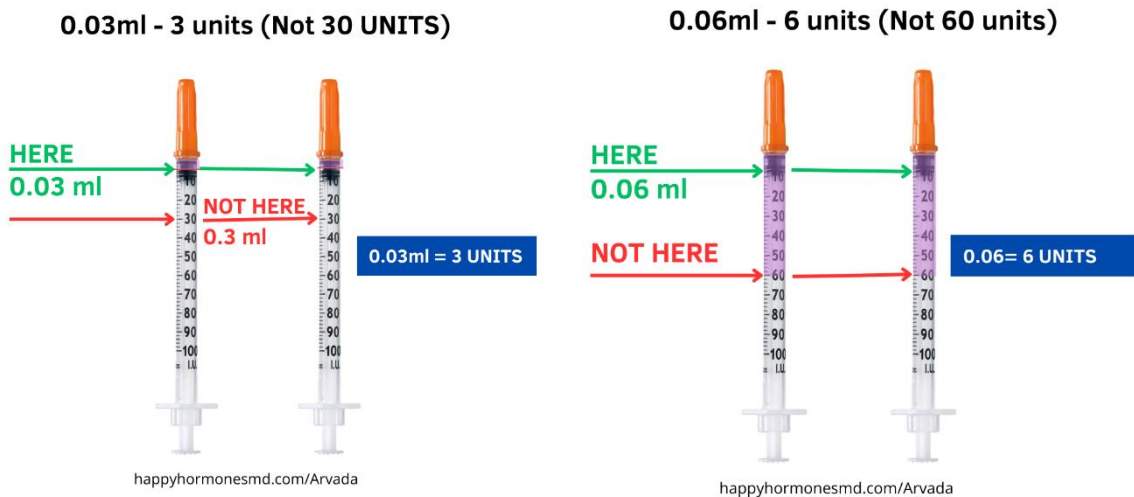
- **Local Reactions (Injectable):** Mild pain, redness, swelling, or irritation at the injection site. Adding a small amount of BPC-157 can help alleviate this reaction. See instructions below.
- **Allergic Reactions:** Rarely, some individuals may experience itching, hives, or other allergic reactions to the compound or its ingredients.

- **Metal Sensitivity:** Since copper is a component, people with metal sensitivities or copper overload (e.g., Wilson's disease) may experience adverse reactions.
- **Nausea or Headaches (Injectable):** Some users report mild nausea, headaches, or lightheadedness following injections.
- **Skin Sensitivity:** While GHK-Cu is known for its skin-healing properties, some people might experience temporary skin sensitivity, especially with overuse or high doses.

### Dosage Guidelines

**Injectable GHK-Cu** is currently only available as a research peptide. Please see document titled "Research Peptide Information" in the Education Folder under Records in the patient portal.

- **Recommended Dose:**
  - **1-2 mg** (0.03-0.06 ml or 3-6 units) **subcutaneous (SQ) injection** daily, Monday through Friday.



**If you are only adding BPC-157 to alleviate the burning sensation:**

**1mg dose of GHK-Cu:** After you draw up **3 units of GHK-Cu**, you would draw up **3 units of BPC-157** into the same syringe. So, there will be a **total of 6 units** in the syringe: 3 units GHK-Cu and 3 units BPC-157.

**2mg dose of GHK-Cu:** After you draw up **6 units of GHK-Cu**, you would draw up **5 units of BPC-157** into the same syringe. So, there will be a **total of 11 units** in the syringe: 6 units GHK-Cu and 5 units BPC-157.

\*Instructions on how to combine medications in the same syringe are included in the video titled “Reconstituting Powdered Medications” in the Education folder under Records in the patient portal.

### Topical GHK-Cu

- **Recommended Dose:**
  - Apply **0.5g – 1g (1-2 pumps) daily** to the skin.
- **Important Note:**
  - **Do not apply GHK-Cu at the same time as Vitamin C products**, as copper counteracts Vitamin C’s antioxidant properties.

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### Cost

**Injectable GHK-Cu is currently only available as a research peptide. Please see document titled “Research Peptide Information” in the Education Folder under Records in the patient portal.**

### Injectable GHK-Cu

- **10 mg/ml – 50mg Vial (Lasts 5 weeks at 0.2ml dose and 10 weeks at 0.1ml dose):** \$108.50 (Includes shipping and bacteriostatic water for reconstitution)
- **10 mg/ml – 100mg Vial (Lasts 10 weeks at 0.2ml dose and 20 weeks at 0.1ml dose):** \$183.50 (Includes shipping and bacteriostatic water for reconstitution)

### Topical GHK-Cu (Compounded)

**Strive Pharmacy - Direct shipping to these States (AZ, CA, CO, DC, DE, FL, GA, HI, IA, ID, IL, KS, MA, MD, ME, MO, MS, MT, NE, ND, NH, NM, NV, NY, OH, OK, OR, PA, PR, RI, SD, TN, TX, UT, WA, WY)**

- **30 gm (5 mg/gm, 0.5%):** \$175 (includes shipping). **30g lasts 30-60 days.**
- **90 gm (5 mg/gm, 0.5%):** \$415 (includes shipping). **90g lasts 90-180 days.**
- **Estriol** can be added at no additional cost.

### Strive Pharmacy - For All Other States

- **30 gm (5 mg/gm, 0.5%):** \$190 (includes shipping). **30g lasts 30-60 days.**
- **90 gm (5 mg/gm, 0.5%):** \$430 (includes shipping). **90g lasts 90-180 days.**
- **Estriol** can be added at no additional cost.

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### Reconstitution Instructions for Injectable GHK-Cu

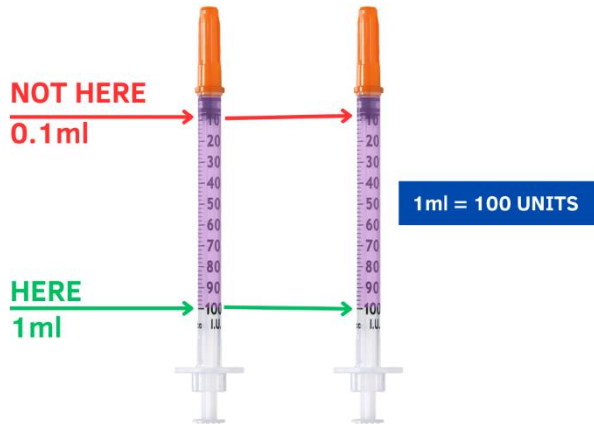
#### IMPORTANT:

- **Follow the instructions below regarding the amount of bacteriostatic water to use when reconstituting the peptide. DO NOT follow the instructions that come with the peptide.**

- Do NOT throw away the vial of bacteriostatic water!!! It is a multiuse vial and can be used for your next order!

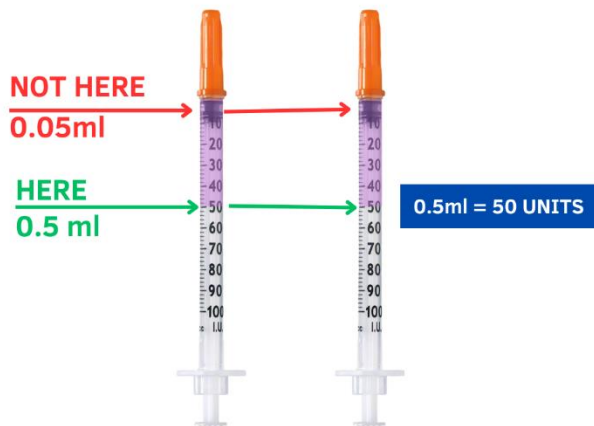
For a **50mg vial**: Inject 1.5ml of bacteriostatic water into the vial (1.5ml = 150 units).

**1 ml - 100 units (Not 10 UNITS)**



happyhormonesmd.com/Arvada

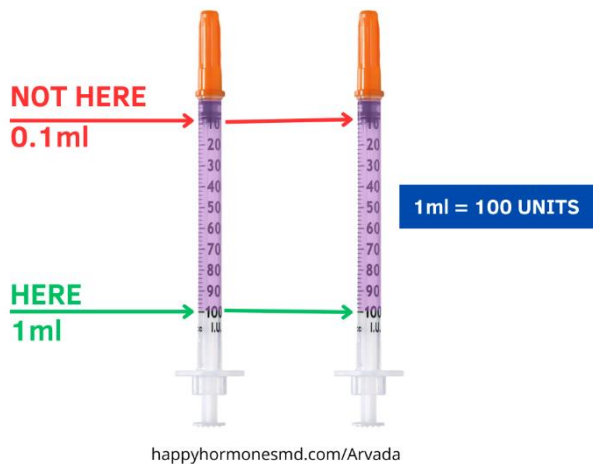
**0.5ml - 50 units (Not 5 UNITS)**



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For a **100mg vial**: Inject 3ml of bacteriostatic water into the vial (3ml = 300 units). You will need to use 3 full 1ml syringes

## 1 ml - 100 units (Not 10 UNITS)



- See the **document** titled “*Reconstituting Medications in Powder Form*” in the Education Folder in the patient portal.
- See the following **Instructional videos** in the Education Folder in the patient portal:
  - “*Reconstituting Powdered Medications*”
  - “*Injection Video – Introduction*”
  - “*Injection Video – Drawing Up the Medication*”
  - “*Injection Video – Administering the Medication*”

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### Storage and Stability

- Vials are shipped as **lyophilized powder**, requiring no refrigeration during shipping.
- In Lyophilized Form:
  - Stable for up to 3 years in the freezer and 2 years in the refrigerator.
  - Protect from light.
- Once Reconstituted:
  - Stable for 6 weeks.
  - Must be refrigerated and kept away from light.
  - Avoid placing vials in the refrigerator door to prevent degradation from frequent temperature changes.

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### Important Disclosures

- The statements in this document have not been evaluated by the US Food and Drug Administration (FDA).

- These products are not intended to diagnose, treat, cure, or prevent any disease.
  - Compounded medications and research peptides are not FDA-approved.
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### Quality Assurance

- All research peptides undergo extensive third-party testing with publicly available Certificates of Analysis (COA).
- Testing includes:
  - RP-HPLC (Reversed-Phase High-Performance Liquid Chromatography)
  - Mass Spectrometry (MS)
  - Sterility testing
  - Additional assessments meeting or exceeding U.S. Pharmacopeia (USP) and USP-National Formulary (NF) standards.
- The manufacturer ensures safety, quality, and efficacy to comply with regulatory mandates.