

## Changes in Tripeptides Produced By the LifeWave X39 Patch

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### Abstract

**Purpose** - To determine if the LifeWave X39 non-transdermal patch can produce changes in tripeptides GHK and GHK-Cu production.

**Materials**- BD Vacutainer Safety Loc Blood Collection sets with Pre-attached holder sized 21GX0.75 or 23GX0.75, lavender top tubes, KendroSorvallBiofuge Centrifuge 75005184+, sterile eye droppers, polystyrene containers, thermal liners and an AB Sciex API4000 Qtrap. Analysis software included: Qtrap Analyst software 1.6.2. and R software version 3.5.1.

**Method** - Blood was drawn into lavender top tubes on day 1, 2 and 7 with blood collection sets and spun in KendroSorvall centrifuge for 10 minutes at 1300rcf at room temperature. The plasma was placed in cryo tubes and flash frozen using dryice, then shipped to the laboratory for analysis. Once there the blood samples were processed according to the original thesis of Dr. Pickard. The filtrate was concentrated by speed-vac and reconstituted with de-ionized water to 50µl and analyzed with AB Sciex API4000 Qtrap. The data was analyzed with Analyst software 1.6.2. Results were then sent for statistical analysis using a Wilcoxon signed rank test. All reported p-values are two-sided and  $p < 0.05$  was used to define statistical significance. Statistical analyses were conducted with R software version 3.5.1. "Copper tripeptide-1(GHK-Cu) is a small protein composed of the three amino acids (protein building blocks) glycine, histidine, and lysine combined in a specific geometric configuration with the physiologically beneficial mineral (copper)" (DeHaven, 2014). It helps repair and maintain all tissue types(DeHaven, 2014).

**Results** - There was a significant increase in GHK in blood seen at 24 hours,  $p < 0.0098$ . A significant increase in GHK-Cu in the blood was also seen at 7 days,  $p < 0.0137$ .

**Conclusion** - This pilot study explored changes in amounts of GHK and GHK-Cu present in blood due to wearing the LifeWave X39 patch for 1 week. There was a significant increase of GHK in blood seen at 24 hours,  $p < 0.0098$ . A significant increase in GHK-Cu in blood was also seen at 7 days,  $p < 0.0137$ .

Keywords: Photobiology, Phototherapy, Meridians

### Introduction

This pilot study explores the impact of wearing the LifeWave X39 patch for one week on levels of GHK and GHK-Cu levels in blood. Blood samples were taken at baseline, 24 hours and 7 days of wearing the patch. A sample of convenience of 10 subjects made up of both men and women aged 40-81 were selected to participate in this study.

### Background

#### Phototherapy

Phototherapy in various forms has been used for over 100 years and has shown benefits for a variety of skin diseases (Singer&Berneburg, 2018), foot ulcer healing, specifically with diabetes (Wang, et al, 2017), and even a first line therapy for mycosis fungoides. (Dogra&Mahajan, 2015). There has been little evidence of negative side effects. This suggests that this is a relatively untapped option for healing with relatively few risks.

The LifeWave X39 patch uses phototherapy to stimulate a rebalancing of the body. Merriam-Webster Dictionary defines "Phototherapy" as "light therapy" (*Merriam-Webster.com Dictionary, 2020*). *It is the use of light in specific wavelengths that vary based on the intended effect to stimulate a specific physiological change.*

"Copper tripeptide-1 (GHK-Cu) is a small protein composed of the three amino acids (protein building blocks) glycine, histidine, and lysine combined in a specific geometric configuration with the physiologically beneficial mineral (copper)" (DeHaven, 2014). This tripeptide was first isolated from human plasma albumin in 1973 by Dr. Loren Pickart. Additional research has established the strong affinity the GHK peptide has for copper, and exists in two forms, GHK and GHK-Cu (DeHaven, 2014). To date, no research of the use of GHK and GHK-Cu has shown elevated liver enzymes (Pickart & Thaler, 1973; Pickart, Thayer, & Thaler, 1973; DeHaven, 2014)

Based on anecdotal observation it was felt that a possible change in both the tripeptide GHK and the copper tripeptide GHK-Cu might be factors in the effects produced by the patch described below. Research has identified that the GHK and GHK-Cu peptides are used to signal the beginning of the natural repair process and demonstrated to improve tissue remodeling. GHK-Cu increases keratinocyte proliferation and normal collagen synthesis, improves skin thickness, skin elasticity and firmness, improves wrinkles, photodamage and uneven pigmentation, improves skin clarity, and tightens protective barrier proteins." (DeHaven, 2014)

### **Purpose of study**

To determine if the LifeWave X39 non-transdermal patch produced changes in tripeptides GHK and GHK-Cu production.

### **Non-transdermal Patch**

*All X39 patches are sealed so that none of the substances in the patch actually penetrate the skin.* This allows for consistent patch promotion of the electrodermal skin response in the infrared, near infrared, and visible light spectrum throughout the time the patch is worn. Electrodermal activity (EDA) is the property of the human body that causes continuous variation in the *electrical* characteristics of the skin. Patches are designed to reflect wavelengths of light in the infrared, near infrared, and visible light bands. The patches act as a transducer and transmitter, like a router on a computer network, or one of the old crystal radio sets. They receive signals from the body, strengthen them, send them back, and then the body receives them. The patches use the same adhesives as band-aids. This limits the level of irritation caused by the adhesive which might be developed through consistent daily use of the patch.

### **Meridian Implications and Patch placement**

Specific meridian points were chosen to maintain consistency and improve comparability between studies. They were also chosen for ease of access and description in the future.

### **Procedure**

Once human research studies ethics board approval was received (NFFE 06-26-19-05), recruitment was begun. Flyers advertising for interested research participants were posted at various local sites. Participants would call into the main study phone number and were assessed according to inclusion and exclusion criteria. Participants were required to be between the ages of 40 and 81, and to not have a history of any significant mental health issues which might have compromised their ability to consent to participating in the study. At the time of arrival at the study site, each participant matching the selection criteria signed their consent. Individual participants were then taken into the exam room and a blood sample was taken at baseline, 24 hours and 7 days of patch placement. Half the participants used the CV6 point and half used the GV14 point. BD Vacutainer Safety Loc Blood Collection sets were used with Pre-attached holder sized 21GX0.75 or BD Vacutainer Safety Loc Blood Collection sets were

used with Pre-attached holder sized 21GX0.75 or 23GX0.75 and placed in lavender top tubes. Each blood sample was then placed in the KendroSorvallBiofuge centrifuge 75005184+ HERAEUS 7591 with a 4000 RPM rotor, and spun for 10 minutes at 1300rcf at room temperature to separate the plasma. The plasma was then placed in cryo tubes, and flash frozen using dry ice. Samples were then placed in 2" thick polystyrene containers, wrapped in thermal box liners and placed in double walled boxes for overnight shipping to HT-Labs, a division of AxisPharm in San Diego, CA for analysis.

### Analysis of Blood Samples

The blood samples were processed according to the original thesis of Dr. Pickard (Pickart & Thaler, 1973) AGAIN WHICH Pickart?]. The filtrate was concentrated by speed-vac and reconstituted with de-ionized water to 50 $\mu$ l and analyzed with AB Sciex API4000 Qtrap. The data was analyzed with Qtrap Analyst software 1.6.2.

### Statistical Analysis

Absolute changes in GHK and GHK-CU levels from baseline, 24 hours, and day 7 assessments were summarized in terms of means, standard deviations, medians and ranges. Changes from baseline to the 24 hours and day 7 assessments were evaluated using a nonparametric Wilcoxon signed rank test. All reported p-values are two-sided and  $p < 0.05$  was used to define statistical significance. Statistical analyses were conducted using R software (version 3.5.1; <http://www.r-project.org/>).

### Results

Our sample of convenience of individuals consisted of 10 individuals, with four men and six women in the study. They had a mean age of 64.2, with an age range of 41 - 73. See significant results of the LifeWave X39 patch testing in Table 1.:

**Table 1. Absolute changes from baseline to 24 hours**

		N	Mean (SD)	Median (Range)	p-value
GHK concentration (ng/ml)	24 hours	10	9.5 (9.0)	6.9 (-3.4-27.5)	0.0098
GHK-Cu concentration (ng/ml)	Day 7	10	4.2 (4.3)	4.0 (-2.6-11.5)	0.0137

The blood analysis of GHK showed an increase at levels at  $p < 0.0098$  within 24 hours and GHK-Cu also showed an increase at  $p < 0.01$  at 7 days.

### Discussion

It is important to recognize that this was both a sample of convenience with a small sample size in a pilot study. However, there was a significant change in the levels of both GHK at 24 hours and GHK-Cu in 7 days. This implies promotion of positive benefits to the body. Further study will need to be done with larger sample sizes and control groups to determine if there is a consistency of results over repeated trials and statistically significant changes when compared with a control group.

### Conclusion

This pilot study explored the changes in amounts of GHK and GHK-Cu present in the blood as a result of wearing the LifeWave X39 patch for 1 week. There was a significant increase in GHK in the blood, seen at 24 hours, at the level of  $p < 0.0098$ . A significant increase in GHK-Cu in the blood was also seen at 7 days, at the level of  $p < 0.0137$ .

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