Neova® Creme de la Copper Combats Photodamage with DNA Repair and Copper Peptide Technologies

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Abstract
Neova® Creme de la Copper now combines an advanced form of DNA repair (Mitosomes) in combination with Copper Peptide Complex® to fight the signs of aging and help restore skin's youthful texture. This new formulation continues to provide the protection and regeneration properties of the advanced ceramides of Skinmimics®.

Introduction

Wrinkles, puffiness, and dark circles under the eyes are not very desirable features for most people despite the fact that they are thought to be inevitable results of aging and environmental stress and damage. Wrinkles, of course, are caused in part by the natural slowdown of repair of the underlying extracellular matrix (ECM) of the skin. The resulting accumulation of fine lines, wrinkles, and sagging skin, can add to an increased appearance of age.

DNA damage is a critical aftermath of UV irradiation due to sunlight exposure and contributes to many of the visible aspects of photoaging. Exposure to UVB causes the formation of thiamine dimmers. DNA damage can also come about during the normal process of cellular metabolism and respiration.

DNA repair refers to a collection of processes used by a cell to identify and correct damage to the DNA from either normal cellular processes or UV radiation. The DNA repair process is constantly active as the cells respond to damage in the DNA structure. The rate of DNA repair is dependent on many factors such as the type of cell, the age of the cell, and the cellular environment. If a cell accumulates a large amount of DNA damage with insufficient repair, it may become dormant (senescence), initiate programmed cell death (apoptosis), or start unregulated cell proliferation (cancer).

Creme de la Copper now combines an advanced form of DNA repair (Mitosomes) along with Copper Peptide Complex technology to fight the signs of aging and help restore skin's youthful texture. The formulation also includes the protection and regeneration properties of the advanced ceramides present in Skinmimics.

Copper Peptide Complex®

Copper is essential to vital cellular and enzyme processes required for human health, and is the third most abundant trace metal in the body, after iron and zinc. Since the 1830s, copper has been known to be an essential nutrient. It was found that copper plays a key role in several of the body's essential enzyme systems needed for tissue repair and other biological responses. These copper-based enzyme systems allow tissue to repair itself, blood vessels to form, wounds to close and inflammation to decrease. Copper is now known to be critical to the normal repair and healing process in all tissue, including connective tissues that comprise human skin, internal organs and bones.

The Copper Peptide Complex in Creme de la Copper is a tripeptide (glycyl-L-histidyl-L-lysine) complexed with copper. The tripeptide was originally isolated from the albumin fraction of human serum[1]. It was subsequently shown that the peptide existed as the copper complex and enhanced the uptake of copper by cells[2-4]. The glycyl-L-histidyl-L-lysine peptide sequence is found in several proteins associated with the extracellular matrix including the large extracellular matrix protein termed SPARC and may liberated by endogenous proteolysis or cleavage of these proteins during the repair and regeneration processes[5-8]. These small peptides liberated from the extracellular matrix were termed matrikines.

Skin health, dermal wound healing and general soft tissue repair requires many of the same biological processes such as reconstitution of an extracellular matrix and increased blood from (angiogenesis). Copper is utilized by essentially every cell and organ; resulting in the formation of

important copper-dependent enzymes - including cytochrome C oxidase (energy production), superoxide dismutase (antioxidation) and lysyl oxidase (cross-linking of elastin and collagen in skin)[9-10].

In numerous studies, copper peptides have been shown to promote new blood vessel growth, enhance the expression of growth factors, activate matrix metalloproteases, and stimulate the formation of new collagen, elastin, and glycosaminoglycan components of tissue to accelerate the repair process[11-17].

More importantly, Copper Peptide Complex, formulated in a wide variety of cosmetic preparations, has shown to both stimulate collagen production and to reduce the visible signs of aging, improve skin laxity, clarity, and appearance, reduce the appearance of fine lines and wrinkles, and to increase skin density and thickness both on the face and eye area[18-21].

As shown below, the activities of copper and copper peptide are all essential to maintaining skin health and reversing the signs of aging.

Activities of Copper and Copper Peptide Scientific Studies	
Collagen	Enhance
Glycosaminoglycans	Enhance
Elastin	Enhance
Angiogenesis	Enhance
Growth Factors	Enhance
Matrix Metalloproteases	Enhance
Performance Evaluations	
Collagen	Enhance
Skin Laxity	Improve
Skin Clarity	Improve
Skin Appearance	Improve
Fine Lines & Wrinkles	Reduce Appearance
Skin Density	Increase
Skin Thickness	Increase

Mitosomes

Mitosomes contain a DNA repair enzyme that recognizes the most common form of oxidative damage to DNA and initiates the repair process. Mitosomes contain an enzyme (OGG1 for 8-oxoguanine DNA glycosylase 1) produced from the common plant Arabidposis that recognizes this damaged base (8-oxo-guanine) and initiates its removal[22-23].

These radicals damage DNA by oxidizing its nucleotide bases from to form 8-oxo-guanine. Mitosomes shorten the time for nucleus DNA repair from 24 hours to 2 hours, Figure 1 Mitosomes tested at 0.3% repair 75% of the oxidative damage on DNA. In vitro testing at 0.5% shows that Mitosomes repair DNA in the mitochondria, Figure 1.

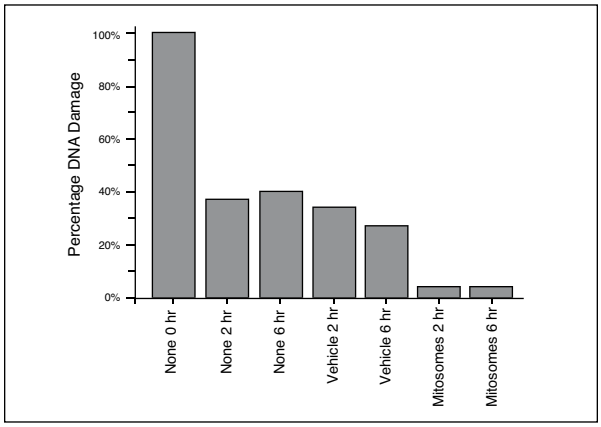

Figure 1. Mitosomes Increase DNA Repair

In vitro testing has shown that 1% Mitosomes completely repaired 8-oxo-guanine in cells in 2 hours, while 0.3% completed repair in about 3 hours[22].

Mitochondrial DNA protection is also important to anti-aging activity. Damage from oxygen radicals is a main factor in aging. These reactive oxygen species come from pollutants in the environment, from UV-A induced reactions in skin, and from the body's own stress responses. In addition, oxygen radicals are the inevitable side-effect of energy mitochondria. The accumulation of damage to mitochondria is considered an important element of aging.

A vital feature of the Mitosomes enzyme is that it also protects mitochondria. The enzyme has a "mitochondrial localization signal" (MLS), which is recognized by the cells transport system, and guides it into mitochondria. This ability allows Mitosomes to repair the DNA in mitochondria after oxidative damage which occurs during normal cellular respiration.

Skinmimics®

Skinmimics was designed to provide a combination of protection, prevention, and regeneration cosmeceutical actives in the form of ceramide technology[24]. It is a mixture of long chain ceramides, cholesterol, and Sphingokines®

signaling molecules. It has been reported that the mixture of Caprooyl-Phytosphingosine and Caprooyl-Sphingosine, components of the Skinmimics mixture, trigger the expression of genes for late-stage epidermal differentiation to enhance the synthesis of key sphingolipids in cultured keratinocytes. Similar results have been reported in studies with volunteers following application of the Skinmimics formulation. A significant reduction in TEWL (Transepidermal Water Loss) and an increase in skin elasticity has been measured. These evaluations confirm that the application of Skinmimics will help mature skin be revitalized through the combination of protection, prevention, and regeneration.

Summary

Creme de la Copper combats the effects of photoaging on the skin. The treatment now combines Copper Peptide Complex technology with a new and powerful therapy—advanced DNA Repair Mitosomes, which contain an enzyme (OGG1 for 8-oxoguanine DNA glycosylase 1) produced from the common plant Arabidposis that recognizes this damaged base (8-oxo-guanine) and initiates its removal. This DNA repair technology is formulated in combination with Copper Peptide Complex technology to fight the signs of aging and help to restore the skin's youthful texture through repair of the underlying matrix of the skin.

This new formulation continues to provide the protection and regeneration properties of the advanced ceramides of Skinmimics, a mixture of long chain ceramides, cholesterol, and Sphingokine signaling molecules. This mixture of Caprooyl-Phytosphingosine and Caprooyl-Sphingosine are reported to trigger the expression of genes for late-stage epidermal differentiation to enhance the synthesis of key sphingolipids in cultured keratinocytes.

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