



Daily cellular regeneration, urban protection, and Epigenetic Science

It combines the efficacy of ingredients from botanical and marine origin, with Epigenetic Science.

Futuristic cosmetics for clinically proven deep nutrition, regeneration and DNA rejuvenation.

ACTIVE INGREDIENTS:

1) OXY-DEFENDER: Electromagnetic Protection and cutting edge in Epigenetics



First active ingredient focused on reducing the biological disorders produced by exposure to **Electromagnetic Radiation**.

Electromagnetic waves are a form of energy consisting in vibrations of electric and magnetic fields. We live in a sea of invisible electronic pollution, which is becoming toxic to our health.

We do not see or perceive them but are increasingly present in our domestic environment. Wherever we might be, non-ionizing radiation is all around us. We are constantly exposed to magnetic fields generated by appliances and domestic electrical installations: mobile phones, WIFIs, microwaves, television, radio, computers, etc.

Special focus: Oxidative stress



The “digitization” of our world means that our cells are exposed to a continuously increased level of non-ionizing radiation, for which they have not adapted. In the last decade, EMR (Electromagnetic Radiation) levels have increased dramatically, and we are starting to realize its negative consequences. EMR is an environmental stress factor for human health, and skin as a physiological barrier is the first

objective of this radiation.

This exogenous stress leads to oxidative cellular stress, the formation of excessive reactive oxygen and nitrogen species and reaction products. It leads to a mitochondrial metabolic dysfunction: ROS causes a disruption of Mitochondrial function and cellular ATP Levels.

The massive oxidative cell stress leads to chronic inflammation. Several studies [1][1][3] have shown that skin exposure to cell radiation suffers several biological parameter alterations:

- ✓ Massive increase in free radical production (ROS)
- ✓ Massive Increase of pro-inflammatory cytokines
- ✓ Decrease in cell regeneration
- ✓ Reduction in structural proteins: key molecules involved in the stratification of the epidermis
- ✓ Lost in cohesion between keratinocytes
- ✓ TEWL increase: dehydration, the skin becomes more vulnerable and sensitive
- ✓ Stratum corneum weakening
- ✓ Disturbed skin refraction: lost in brightness, becoming dry and uncomfortable

OXY-DEFENDER is a functional ingredient proved to reduce the skin biological alterations, resulted from the exposure to EMR.

It helps at the restoration process of the skin, being a specific anti-stress agent. It is a **concentrated solution of purified marine glycogen**, ready to use at cosmetic skin care preparations.

Glucose is the most important sugar at the cellular level. It plays a very important role in the energetic metabolism of the cells. Its energy is used at the restoration process of the skin.

→ **Efficacy studies:**

- **Effects of OXY-DEFENDER Preventing and protecting from electromagnetic radiation-induced oxidative stress**

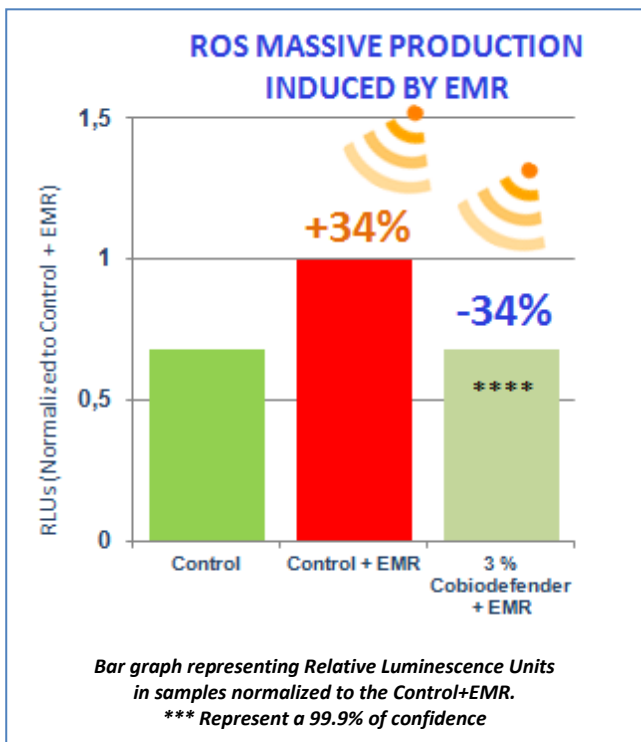
Several exogenous stimuli such as ionizing radiation, EMR, UV light, smoke, inflammatory processes and some human diseases trigger off free radicals production, causing severe damage in the mitochondrial membranes provoking the massive release of free radicals (ROS).

The goal of this study was to evaluate the capacity of **OXY-DEFENDER** in protecting cells from the damage caused by induced electromagnetic radiation (EMR), by reducing oxidative stress (ROS).

To this end, Human keratinocyte cells were exposed to 6 hours of EMR generated by a mobile phone to assess the response of skin cells to the induced oxidative stress and test the potential of **OXY-DEFENDER** to prevent EMR-induced ROS.

After 6 hours exposition, EMR induced ROS accumulation $34,26 \pm 3,13\%$ and treatment with **OXY-DEFENDER** reduced EMR-induced ROS production $34,82 \pm 3,12\%$ indicating a protective effect.

Cellular epigenetic rejuvenation





Epigenetics is a new paradigm in the Science of Anti-Aging.

It is the study of the mechanisms involved in the regulation of gene activity: the biological mechanisms that will switch genes on and off without altering their sequence.

Epigenetic change happens regular and naturally but can also be influenced by several factors including age, the environment (UV radiation, pollution...), lifestyle, emotions and diseases and much more that are yet to be discovered.

These factors discussed above, have the ability to "turn" or "turn off" certain genes, whose effects will be observed physically or physiologically.



The "on" or "off" effect of genes can be accomplished by three mechanisms:

- 1) MicroRNAs
- 2) Histone modification
- 3) DNA mutilation

Epigenetics and the future of skin care

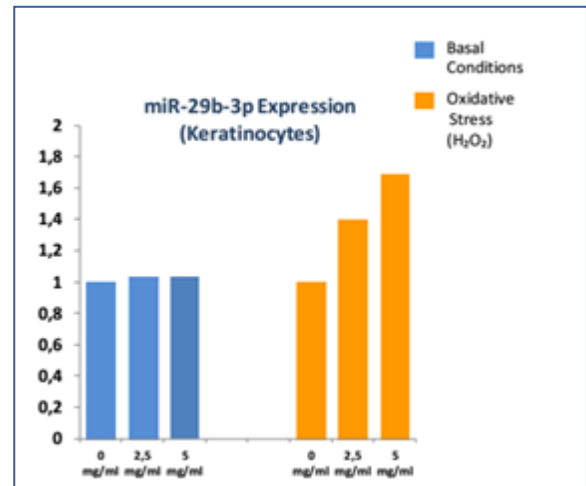


We can regulate microRNA expression to rejuvenate. miRNAs are involved in regulation processes such as cell cycles, DNA repair systems, reactions to oxidative stress, apoptosis, etc.

During aging and other external aggressions, chromatin (the genetic material in the nucleus of our cells) becomes senescent and disorganized contributing to premature aging.

OXY-DEFENDER is a natural epigenetic active ingredient that can regulate microRNA expression. This means that it has the ability to act on the expression of miRNAs and "switch on" or "switch off" certain genes.

- By in vitro assays in human keratinocytes (skin cells), **OXY-DEFENDER** has been shown to have the ability to rejuvenate cellular chromatin, making aging cells acquire characteristics of young cells.



OXY-DEFENDER increases the expression

of miR-29b-3p, a miRNA that "switch on", or "activates" the synthesis of protein P53: **Protein guardian of genetic material**, which has a **potent antioxidant, anti-stress and anti-aging activity**.

- Under conditions of cellular stress induced by photo-oxidation (photo-aging) and oxidative stress, (by hydrogen peroxide), **OXY-DEFENDER** reduced the levels of **H3K79me3**, a miRNA considered as an **aging clock, inducing a cellular rejuvenation**.

Summary of OXY-DEFENDER activity:

- ✓ Protection of oxidative stress caused by electromagnetic radiation
- ✓ DNA protection and rejuvenation
- ✓ Anti-aging activity
- ✓ Aged cells acquire characteristics of young cells

2) SYNERGISTIC COMBINATION OF SYNTHETIC PEPTIDES:

contains 3 synthetic peptides with the following functions:

- A **first peptide (Acetyl hexapeptide)** based on the transforming growth factor- α (TGF- α), with a marked effect on skin rejuvenation.

This synthetic peptide based on the TGF- α has a very marked effect on the homeostasis of extracellular matrix (ECM). The technology used in obtaining this peptide makes it act as a mediator cell signaling certain cellular activities that are necessary to maintain the youthful and healthy appearance of the skin. Some researchers refer to TGF- α as essential for the production of collagen and elastin. They also believe that TGF- α may be the answer to maintaining youthful skin indefinitely.

- **A second synthetic biomimetic and sophisticated peptide (Acetyl hexapeptide)** with a similar action to the botulitic toxin type A one, in reducing facial gestural wrinkles due to the contraction of muscles during facial expression effect.
- **A third synthetic peptide (Palmitoyl hexapeptide)** that prevents skin aging by its potent inhibitory action against metalloproteases that are responsible for the destruction of the extracellular matrix.

With all these actives we achieve an extremely advanced ingredient in order to make a breakthrough in the aging technology, as both preventive treatment level is achieved.

This combination of peptides stimulates the ability of cells to repair the damage more efficiently and stimulates the synthesis of collagen and elastin.

Secondly, enhances the repair functions or "reconstruction" providing the cell with the precise signals so that they can interpret and follow the correct instructions as if they were young and healthy cells.

3) HOMEOSTATINE: *Enteromorpha compressa* marine pentasaccharide



HOMEOSTATINE is a novel hydro-colloidal three-dimensional matrix of galactomannans of Andean origin, derived from the seeds of *Caesalpinia Spinosa* (Mol.) O.Kuntze, which sequentially releases, a marine pentasaccharide derived from the algae *Enteromorpha compressa* (L.) Nees.

This product helps recover and maintain **homeostasis in the dermal extracellular matrix**, which results in a **reduced amount of wrinkles**.

The action of HOMEOSTATINE is aimed at preventing and/or fighting skin wrinkles. To that end, this product acts on the following processes:

- Increases the production of dermal collagen and other ECM components in fibroblasts.
- Inhibits the synthesis of metalloproteinases (MMP)
- Inhibits the synthesis of pro-inflammatory mediators

Thus, its application on the skin triggers a number of beneficial effects aimed at restoring the extracellular matrix homeostasis. The final outcome is a rejuvenated, less wrinkled, firmer, more elastic and better-moisturized skin.

→ In-vivo clinical study: Evaluation of the anti-wrinkle effect

The anti-wrinkle effects of HOMEOSTATINETM were evaluated by FOITS (Fast Optical In vivo Topometry of human Skin). This technique allows for in vivo quantitative analysis of the skin surface topography by using an optical system (projection unit, measurement sensor, high-resolution digital camera, and software) designed to measure surface micro-relief.

The data recorded by this optical system on a 12 cm² surface yielded a “main wrinkle” value (SPt) and an “average area rugosity” (Spa) value, which were entered into a software designed to reconstruct the image of the analyzed surface.

This assay was conducted in the crow’s feet area of the face of 12 female volunteers, aged 44-58 years. The volunteers applied an HOMEOSTATINE 2%-containing cream on one side of the face and a placebo cream on the other side, twice a day for 8 weeks. Measurements were made at the beginning (T0) and at the end (T56) of the treatment.

Reduction in wrinkles size and depth can be observed for the HOMEOSTATINETM -treated area, while no change can be noticed for the placebo-treated area:

Pictures of the HOMEOSTATINETM-treated area

4) VITAMIN E: Powerful antioxidant

Vitamin E is a key ingredient in the structure of cells. It is a powerful antioxidant that acts against free radicals, being an essential component for the care of the skin, which delays the cellular aging caused by oxidative damages.

5) OLIGOHYAFERRE:

consists of hyaluronan oligosaccharides with a molecular weight of less than 5000 Da. These short chains of disaccharide units occur naturally in the skin, where they engage in a wide spectrum of biological activity.

OligoHyaferre has these properties and, in view of its effects on internal processes in the skin, has proved to be a highly effective weapon in the fight against external signs of aging

OligoHyaferre actively contributes to the suppression of wrinkles in both layers of the skin:

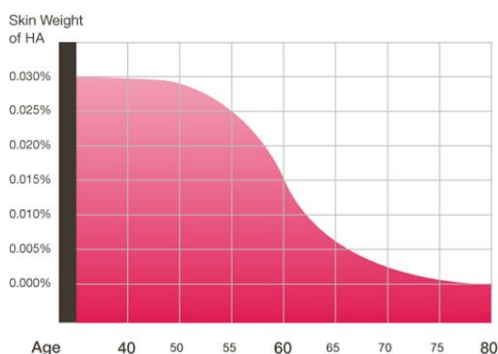
- **At the level of the epidermis**, its ability to stimulate the endogenous synthesis of high-molecular hyaluronan is manifested particularly well.
- **At the level of the dermis**, OligoHyaferre is particularly good at suppressing the manifestation of proinflammatory cytokines. Excessive production of these substance triggers adverse developments in the immune response, producing, for example, increased quantities of free radicals

6) HYALURONIC ACID:



Hyaluronic acid (HA) is a polysaccharide from the type β - links glycosaminoglycans, having a structural function, such as chondroitin sulfates. It has the capacity to absorb more than 1000 times its volume in water.

That is why it is used in epidermis moisturizing the as it reconstructs the fibers that hold skin tissues, giving a better shape. With a very high viscoelasticity, it is a natural component part of the skin and is essential to fight aging and wrinkles due to its high moisturizing power.



In the dermis, hyaluronic acid is the main component of the extracellular matrix (ECM). Fibroblasts are a cell type responsible for the production of collagen and elastin in the skin. ECM extracellular matrix is the space between the skin cells. This makes the skin soft, smooth and elastic.

Young skin (soft and elastic) contains high amounts of HA (Hyaluronic acid).

- ✓ Retains moisture and elasticity in the tissues (moisture retention in the extracellular matrix (ECM))
- ✓ Protects against environmental stress
- ✓ Helps to reduce the appearance of wrinkles and expression lines.

7) ALOE VERA: Excellent moisturizer



Aloe juice is obtained from the pulp of its fleshy leaves by physical processes. It consists of a **complex mixture of more than 20 substances**, including mono and **polysaccharides, anthraquinones, enzymes, vitamins (A, B1, B2, B6 and B12), salicylic acid, saponins, sterols, and minerals [4]**. It's moisturizing, soothing, anti-inflammatory, anti-allergic and regenerative properties are well known.

Fatty acids: cholesterol, campesterol, β -sisosterol and lupeol. All have anti-inflammatory action. Lupeol also has antiseptic and analgesic properties.

It contains **phytohormones: auxins and gibberellins** that aid in wound healing and have anti-inflammatory action [5].

Aloe juice has been shown to **enhance the cellular structure of fibroblasts** and to **accelerate the process of collagen synthesis [6]**.

It is an excellent moisturizer, so it captures atmospheric water by moisturizing in depth as it acts on the three layers of skin: epidermis, dermis, and hypodermis.

8) MACADAMIA OIL: Elasticity and tone



Macadamia oil is **very rich in monounsaturated fatty acids (palmitoléico and oleic acid)** so it helps to prevent the oxidation of cells, regenerates the skin in depth and helps to **fight the appearance of wrinkles** and also give it very properties Soothing and soothing. Returns elasticity, turgor, and tonicity to devitalized skin.

9) SHEA BUTTER: intense and lasting moisturizing power



Shea butter is composed mainly of **palmitic acid (2-6%)**; **Stearic acid (15-25%)**; **Oleic acid (60-70%)**; **Linolenic acid (5-15%)**; **Linoleic acid (<1%)**, as well as an unsaponifiable fraction that confers it a **great moisturizing and emollient capacity**. It contains **antioxidants** such as **tocopherols (vitamin E)** and **catechins** (which are also found in green tea).

Other specific compounds have been detected as **triterpene alcohols**, with **anti-inflammatory properties**; **Esters of cinnamic acids**, which have a limited ability to **absorb ultraviolet (UV) radiation**, and **lupeol**, which **slows down the skin aging** phenomenon by **inhibiting enzymes** that degrade skin proteins.

Shea butter also protects the skin by **stimulating the production of structural proteins by specialized dermal cells**. Its components give it an **intense and lasting moisturizing power**, improving the elasticity of the skin due to its nutritive properties and its high vitamin F content, a vital component of the cellular membranes. It is also an anti-irritant par excellence, very suitable for skins that redden easily, and with an allergic tendency.

10) SWEET ALMOND OIL: Skin barrier restoration



It has a **powerful restorative activity of the barrier function of the skin**. Sweet almond oil is an oil with a **strong emollient power** that favors the regulation of the lipid phase of the skin mantle, due to its content in **unsaturated fatty acids**. By increasing the cutaneous levels of these essential fatty acids, increases the production of **beneficial eicosanoids with an anti-inflammatory effect**.

The unsaponifiable fraction of the sweet almond, consisting mainly of **squalane**, **tocopherol**, and **phytosterols**, guarantees to the skin the contribution of **highly nutritive substances**, acting on the dermic connective tissue, **favoring the tone and the elasticity** of the skin.

References:

[1] Exposure to Electromagnetic Radiation Induces Characteristic Stress Response in Human Epidermis *Journal of Investigative Dermatology* (2008) 128, 743–746.

[2] Non-thermal activation of the hsp27/p38MAPK stress pathway by mobile phone radiation in human endothelial cells: a molecular mechanism for cancer- and blood-brain barrier-related effects. Leszczynski D1, Joenväärä S, Reivinen J, Kuokka R.

[3] Mobile phone radiation might alter protein expression in human skin. Anu Karinen, Sirpa Heinävaara, Reetta Nylund and Dariusz Leszczynski.

[4] **Potential of herbs in skin protection from ultraviolet radiation.**

Radava R. Korać and Kapil M. Khambholja. *Pharmacogn Rev.* 2011 Jul-Dec; 5(10):164–173.

[5] Aloe Vera: a short review. Amar Surjushe, Resham Vasani, and D G Saple

[6] **Dietary Aloe Vera Supplementation Improves Facial Wrinkles and Elasticity and It Increases the Type I Procollagen Gene Expression in Human Skin in vivo.**

Soyun Cho, M.D., Ph.D., Serah Lee, M.S., Min-Jung Lee, M.S., Dong Hun Lee, M.D., Chong-Hyun Won, M.D., Ph.D., Sang Min Kim, Ph.D., and Jin Ho Chung, M.D., Ph.D. corresponding author