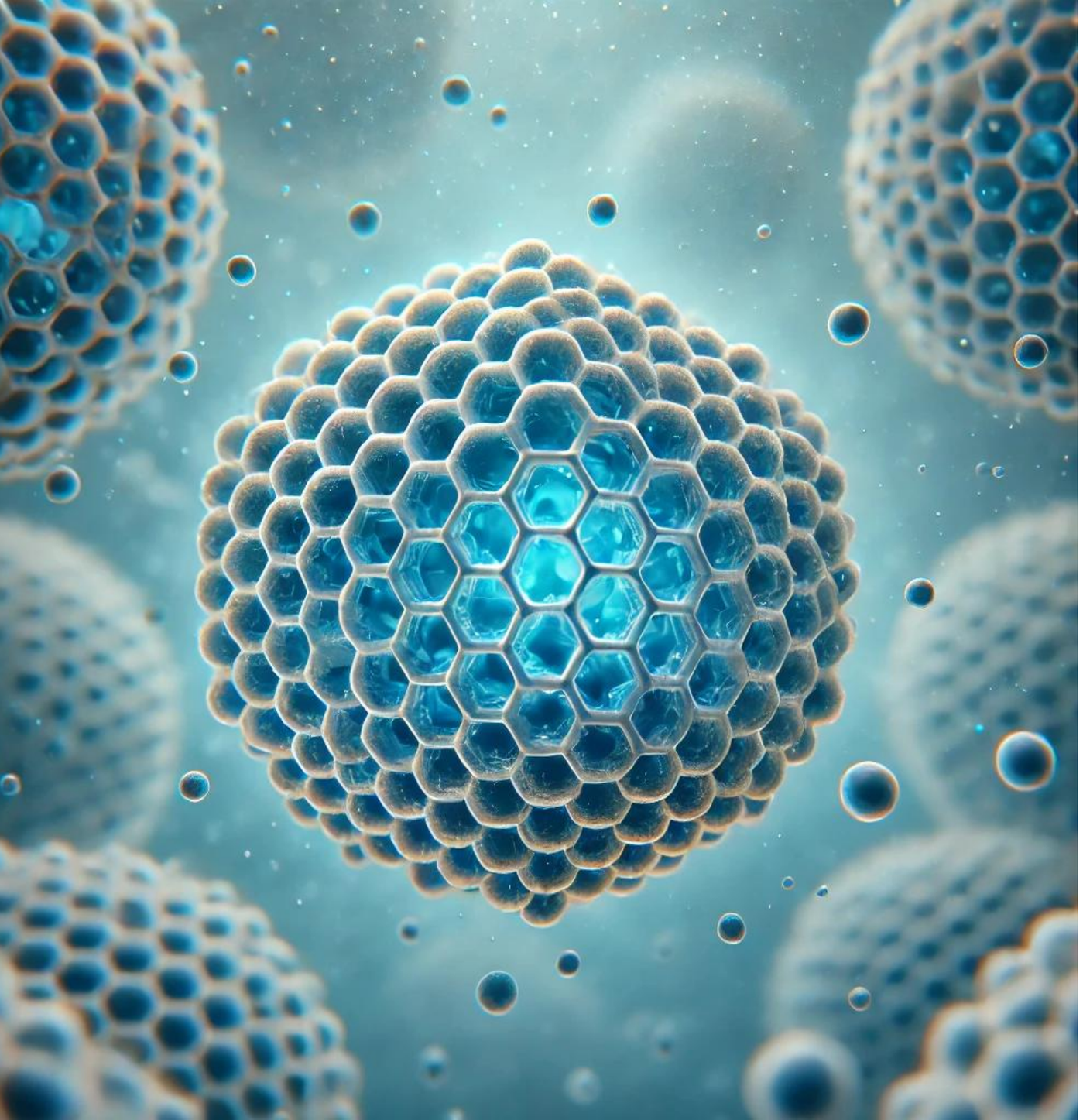


EPHYSTEM PID

Unlocking Well-Aging with Advanced Exosome Technology

EPHYLA
Natural Active Design

Exosome-Mediated Epigenetic Modulation: A New Approach to Well-Aging

EphySTEM PID harnesses the power of millions of exosomes to deliver targeted epigenetic action.

These natural messengers stimulate Sirtuin 1 activity, promote DNA repair, and enhance skin regeneration, addressing the root causes of aging.

By restoring cellular health and resilience, EphySTEM helps unveil your skin's natural beauty and vitality.

The Epigenetic Science behind Ephystem PID

01 Epigenetic Activation

Sirtuin 1 (SIRTI) is a key epigenetic regulator that delays cellular aging by promoting DNA repair, maintaining genome stability, and preventing telomere attrition. By modulating critical pathways, SIRT 1 protects against oxidative stress and cellular senescence, supporting tissue homeostasis and longevity.

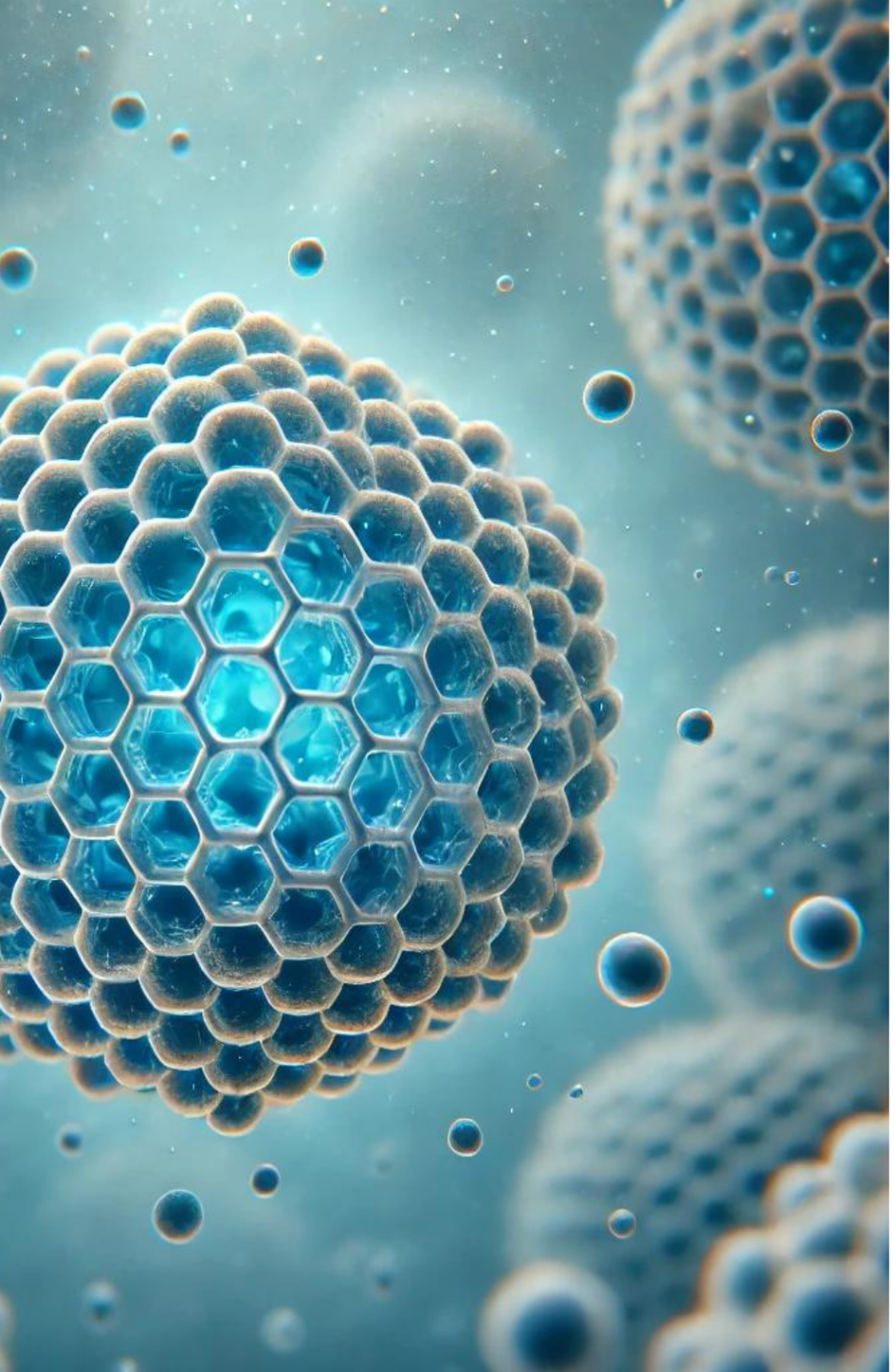
02 Antioxidant Defense

Reactive oxygen species (ROS) are reactive molecules produced during cellular metabolism. While essential in moderation, excessive ROS leads to oxidative stress, damaging DNA, proteins, and lipids, contributing to cellular dysfunction and aging. Targeting ROS through antioxidants or redox signaling modulation is vital for promoting healthy aging and protecting skin health.

03 STEM CELLS protection ECM Regeneration

Similar to natural vesicles, exosomes protect stem cells from environmental stressors like UV radiation, preserving the skin's regenerative capacity.

Exosomes improve skin structure by delivering actives that inhibit collagenase and stimulate procollagen I production, addressing Extra Cellular Matrix (ECM) degradation associated with aging.



MILLIONS of EXOSOMES delivered to your skin

In biological systems, cells naturally communicate and transport essential molecules using vesicles like exosomes and extracellular vesicles (sEVs).

These vesicles carry proteins, lipids, and genetic material to maintain cellular health and repair damaged tissues.

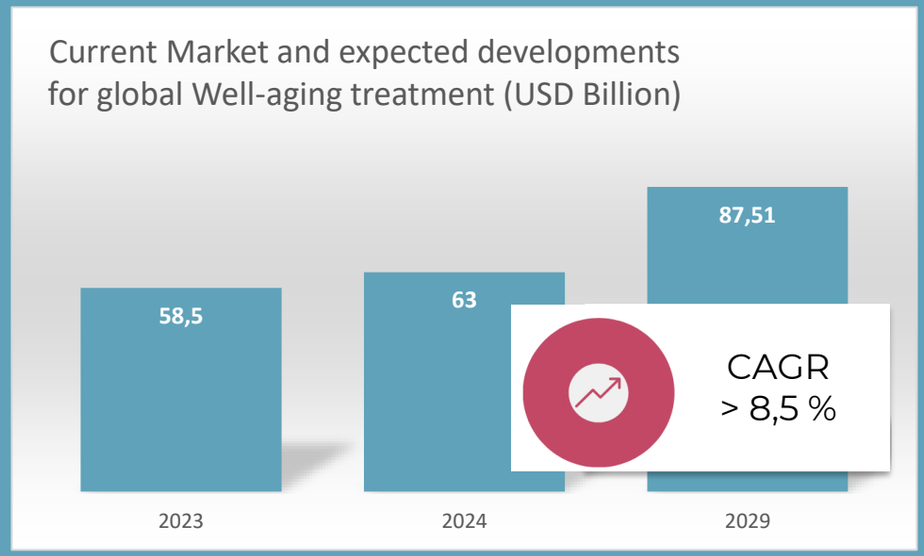
Ephystem PID establishes a new benchmark in exosome delivery, achieving an impressive concentration of approximately **49 Million exosomes per milliliter ***

* This exceptional performance is validated through a cutting-edge biological assay designed specifically to distinguish exosomes from biological aggregates, ensuring precision and reliability.

The desire for healthy, radiant skin is intrinsic to our sense of well-being at every stage of life. Well-aging is more than just minimizing wrinkles; it's about nurturing skin health from within, promoting resilience, and embracing the natural beauty of maturing skin. Concerns such as uneven tone, loss of elasticity, and increased sensitivity can impact self-confidence, making a proactive approach to skin health essential for overall well-being.

The Well-aging global market

- **Increased Awarness:** consumers are more informed about the science of aging and the importance of proactive skincare.
- **Demande for Natural Solution**: there is a growing preference for natural and sustainable ingredients.
- **Focus on Prevention**: consumers are increasingly interested in preventative skincare measures.



Data Research & Markets

Empowering Communities Through Sustainable Sourcing

Faced with today's growing challenges, Ephyla has made supply chain sustainability and resilience a cornerstone of its strategy, building decades of proven expertise

In response to the deforestation and discrimination that marginalize the Baka people, a semi-nomadic people leaving the tropical rainforest of Central West Africa, Ephyla empowers them through a program focused on protecting their rights and ecosystem. Ephystem PID is central to this effort, showcasing how sustainable sourcing can drive job creation, education, and environmental responsibility, ultimately preserving our shared ecosystems for future generations.

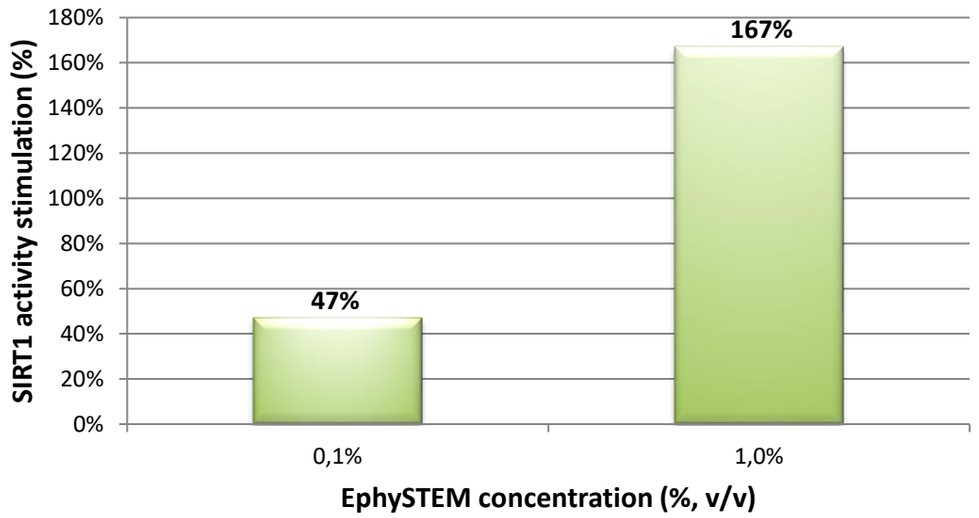
The Role of Sirtuin 1 in Preventing Senescence and Promoting DNA Repair

- Sirtuin 1 is an essential factor that delays cellular senescence and extends the organismal lifespan through the regulation of diverse cellular processes.

- The Sirtuin 1 - related suppression of cellular senescence is mainly mediated through the prevention of telomere attrition and the promotion of DNA damage repair. Sirtuin 1 play vital roles in sustaining genome integrity, by contributing in maintaining the normal chromatin condensation state, and responding to DNA damage and repair.

EphySTEM enhances its capacity to restore genome integrity, postpone cellular senescence, and maintain tissue homeostasis.

Evaluation of the sirtuin I enzymatic activity stimulation by an acellular *In Vitro* model



EphySTEM, at a dose of 1%, **stimulates SIRT1 activity by 167%**

+ *In Vitro*

MATERIAL AND METHOD

Sirtuin 1 activity modulation: An acellular colorimetric model using an analytical kit was used to evaluate sirtuin 1 stimulation.

Treatment with EphyStem PID: Enzyme activity was tested in presence of EphyStem PID at concentrations ranging from 0,1% to 1,0%.

Data Analysis: The resulting coloration was measured at 405nm. Sirtuin 1 stimulation was expressed as a percentage relative to the positive control.

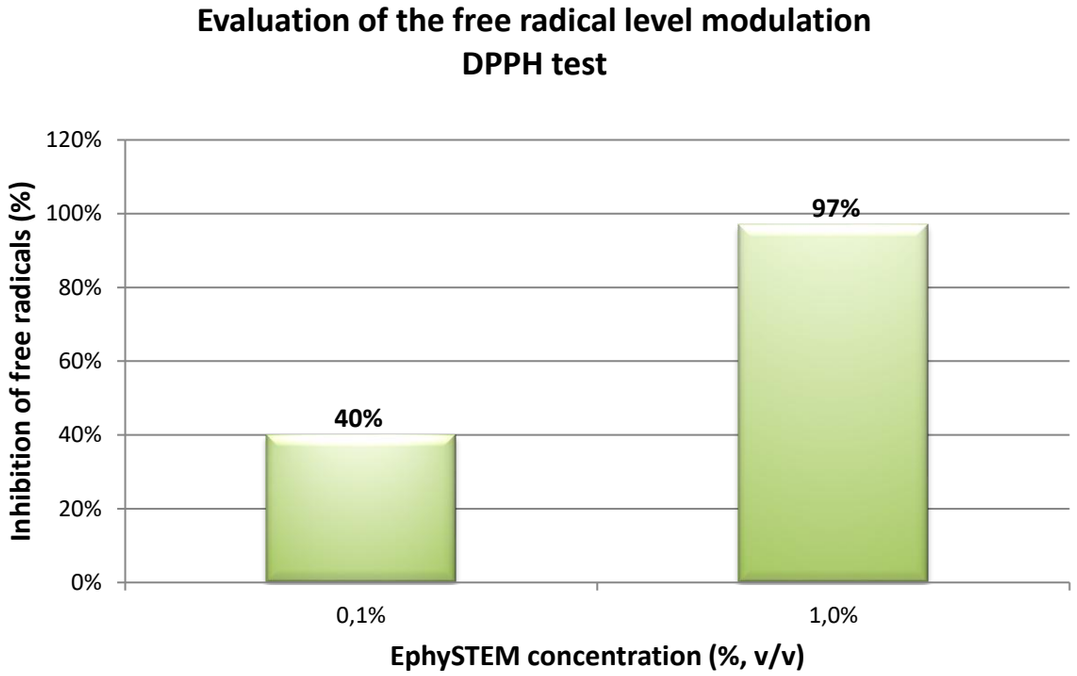
Skin Aging Decoded: The Impact of ROS and Epigenetic Factors

INFLAMMATION

As chronological age advances, **ROS levels increase** to support **cellular metabolism**. ROS then reach critical levels, and generate **damage associated with age.**

The **ROS** load in the skin is **higher than in any other organ**. It is admitted that there is a correlation between ROS originating from external and internal aggressions and a pro-aging effect. With the skin, extrinsic aging (environmental influences) is at least as important as intrinsic aging (genetic and **epigenetic factors**). Surprisingly, it is also accepted that only three percent of all aging factors have a genetic origin... **Epigenetics Is therefore a key factor at the heart of skin aging.**

EphySTEM significantly **reduces oxidative stress** that would otherwise damage DNA, proteins, and lipids, key factors in cellular dysfunction and premature aging.



EphySTEM at a dose of 1% achieves a remarkable **97% inhibition of free radicals.**

+ *In Vitro*

MATERIAL AND METHOD

Free radical inhibition: An acellular colorimetric model using DPPH technic was used to evaluate free radicals' inhibition/reduction.

Treatment with EphyStem PID : Enzyme activity was tested in presence of EphyStem PID at concentrations ranging from 0,1% to 1,0%.

Data Analysis: The resulting coloration was measured at 540nm. DPPH reduction, i. e. free radicals, was expressed as a percentage relative to the positive control.

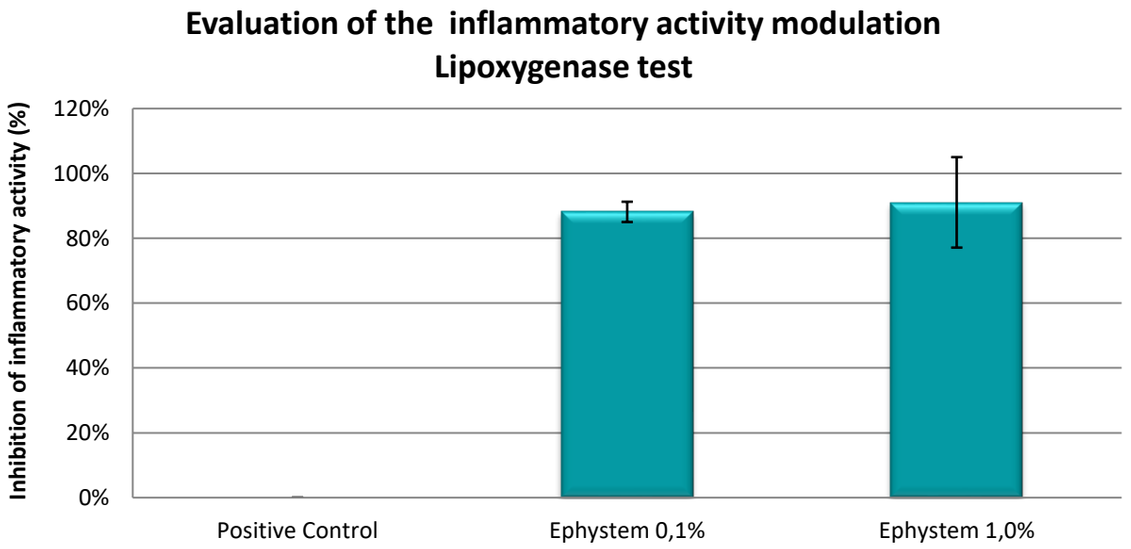
+ *In Vitro*

MATERIAL AND METHOD

Lipoxygenase activity modulation: An acellular colorimetric model using an analytical kit was used to evaluate inflammation modulation.

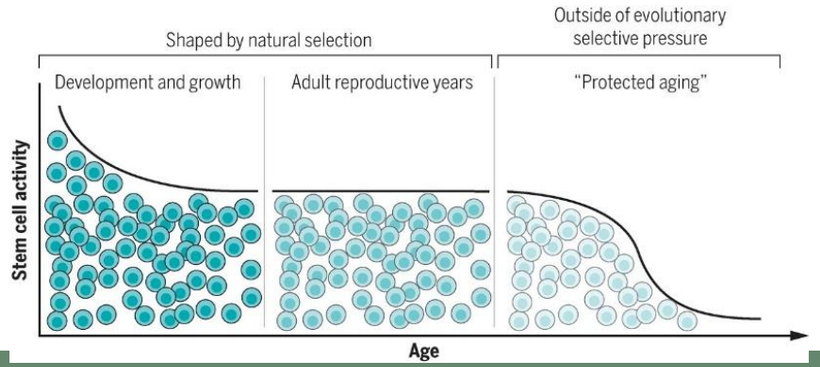
Treatment with EphyStem PID: Enzyme activity was tested in presence of EphyStem PID at concentrations ranging from 0,1% to 1,0%.

Data Analysis: The resulting coloration was measured at 500nm. Lipoxygenase inhibition was expressed as a percentage relative to the positive control.



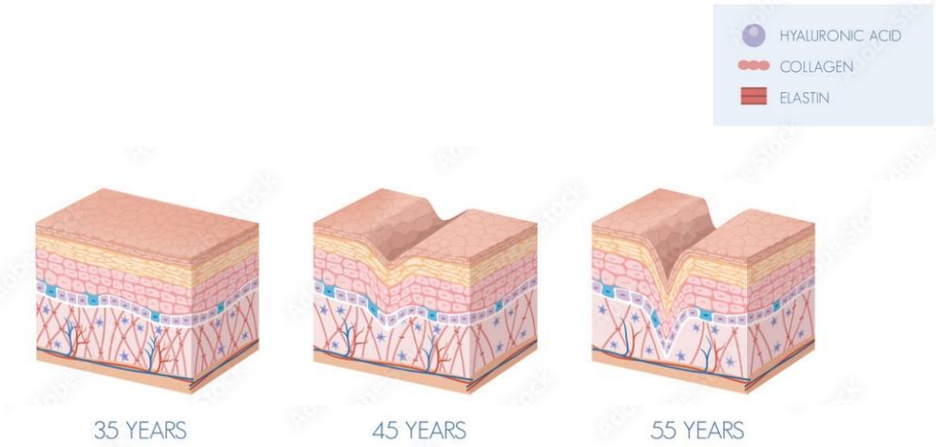
EphySTEM at a dose of 1% is able to inhibit by **more than 90%** the activity of **Lipoxygenase**.

Regenerative Potential and ECM Integrity: Key to Well-Aging



STEM CELL EXHAUSTION

One of the most obvious characteristics of the aging process is the progressive decline in the regenerative potential of tissues. Homeostasis and tissue repair in adult organisms depend on stem cells. Stem cell exhaustion has been defined as one of the hallmarks of aging and determines the tissue repair ability of organisms.



ALTERETED MECHANICAL PROPERTIES

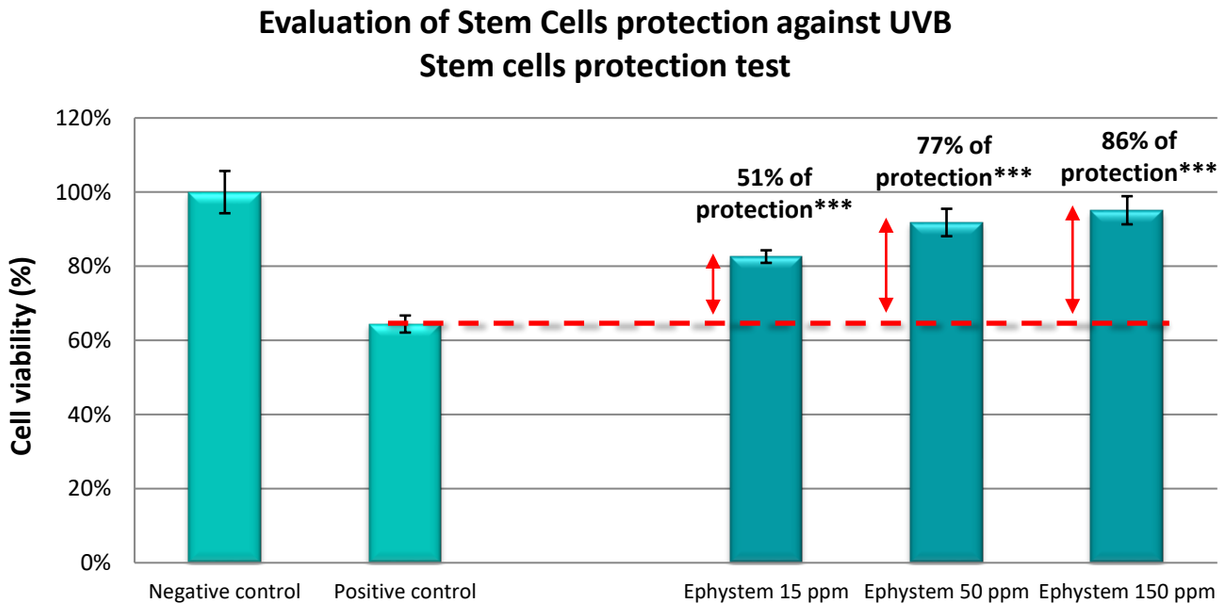
The extracellular matrix (ECM) provides the environment for many cells types within the body including Skin. In addition to the well recognized role as a structural support, ECM influences many important cell process within the body including **proliferation, adhesion, migration, cell differentiation and cell death**.

As a result, **age-related changes to the proteins of the ECM** have far reaching consequences with the potential to **disrupt** many different aspects of homeostasis and healthy function.

In order to maintain a fully functional ECM **EphySTEM** provides 3 different strategies:

1) **Preservation by collagenase inhibition**
2) **Stimulation of the procollagen I**
3) **Restoration by increasing cell recolonization**

EphySTEM, through its **epigenetic action** protects the genetic material of differentiated cells, and **maintains** the youthfulness of the skin by **preserving** the stem cells.



EphySTEM is able to **protect 86% of the stem cells** pool under UV stress.

+ *In Vitro / In Cellulo*

MATERIAL AND METHOD

Keratinocytes isolation: Normal human keratinocytes were obtained from a 76-year-old donor.

Culture Conditions:. Cells were maintained at 37°C in a humidified atmosphere containing 5% CO_2.

Stem cells protection test: At approximately 80% confluence, stem cells were added in media following Goodell *et al.*'s method before addition of EphyStem PID at concentrations ranging from 15 ppm to 150 ppm.
Cells were pre-incubated for 24h before irradiation with UVB (30 mJ/cm^2). Cells were incubated again for 6 days in presence of EphyStem PID.

Cell viability: Blue Alamar test was performed with measurement of fluorescence at 560/590nm.

EphySTEM acts at the heart of the skin matrix by **stopping the degradation** of collagen by inhibition of the collagenase activity in order to preserve the ECM in skin tissues.

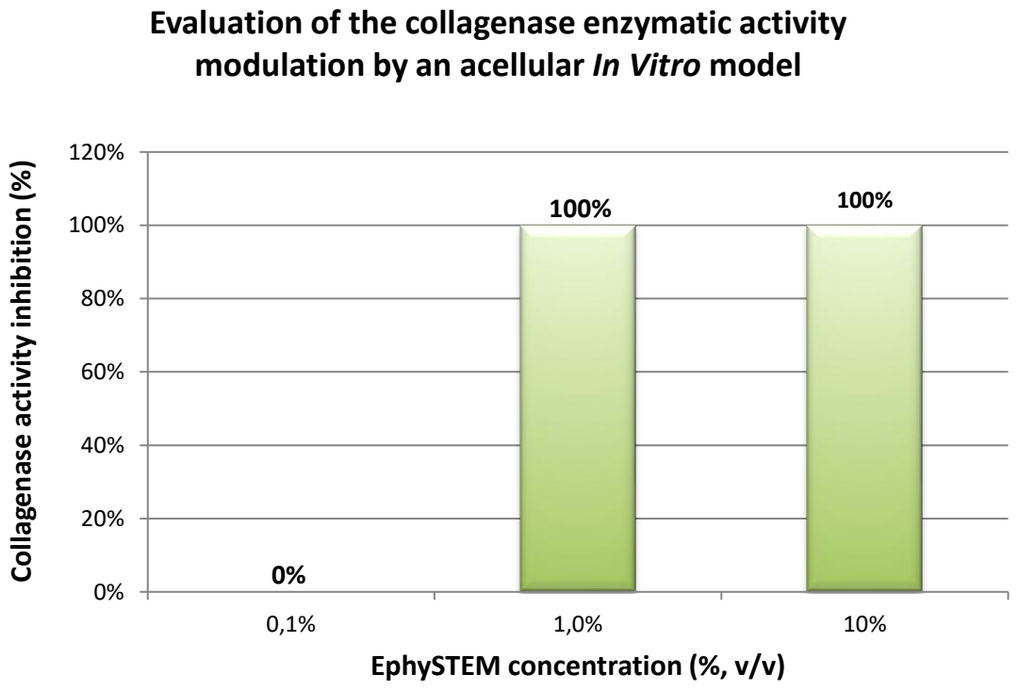
+ *In Vitro*

MATERIAL AND METHOD

Collagenase activity modulation: An acellular colorimetric model was used to evaluate inhibition of basal enzyme activity.

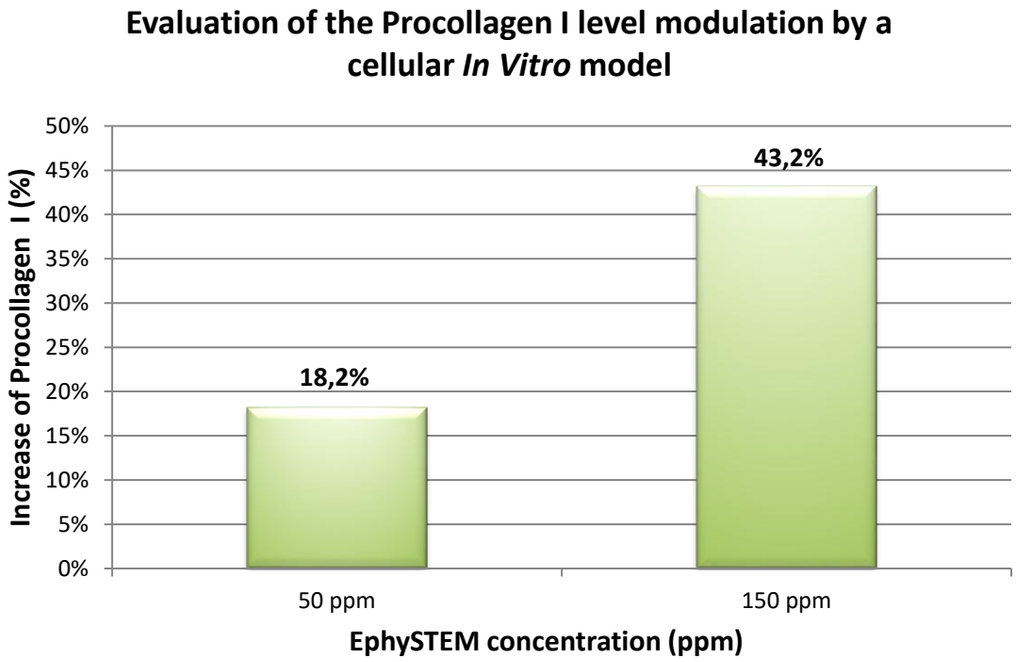
Treatment with EphyStem PID: Enzyme activity was tested in presence of EphyStem PID at concentrations ranging from 1,0% to 10,0%.

Data Analysis: The resulting coloration was measured at 565nm. Collagenase inhibition was expressed as a percentage relative to the positive control.



EphySTEM, from the dose of 1%, is able to **inhibit 100% the collagenase activity**

Not only does **EphySTEM** effectively protect collagen, but its epigenetic action acts at the heart of the skin matrix by **boosting the production of collagen I**



EphySTEM, from the dose of 150 ppm, is able to **stimulate 43 %** the procollagen I synthesis.

+ *In Vitro / In Cellulo*

MATERIAL AND METHOD

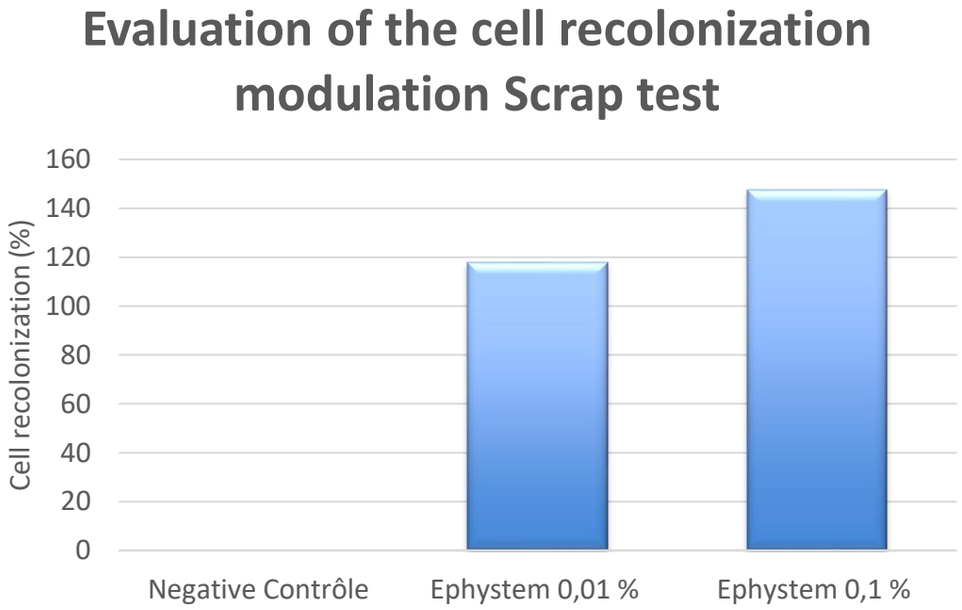
Fibroblasts isolation: Normal human fibroblasts were obtained from a 68-year-old donor.

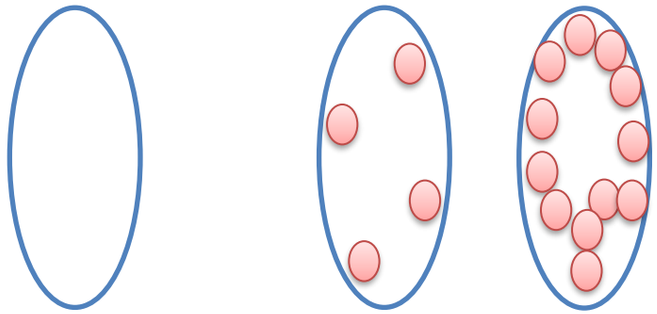
Culture Conditions:. Cells were maintained at 37°C in a humidified atmosphere containing 5% CO_2.

Treatment with EphyStem PID At confluence EphyStem PID at concentrations ranging from 15 ppm to 150 ppm and cells were incubated for 48h.

ProCollagen level: Total proteins was measured using Bradford spectrocolorimetric method and ProCollagen I level was measured using a specific ELISA kit.

+ *In Vitro / In Cellulo*





EphySTEM at a dose of 1% is able to increase by more than **47%** the recolonization of the cell carpet.

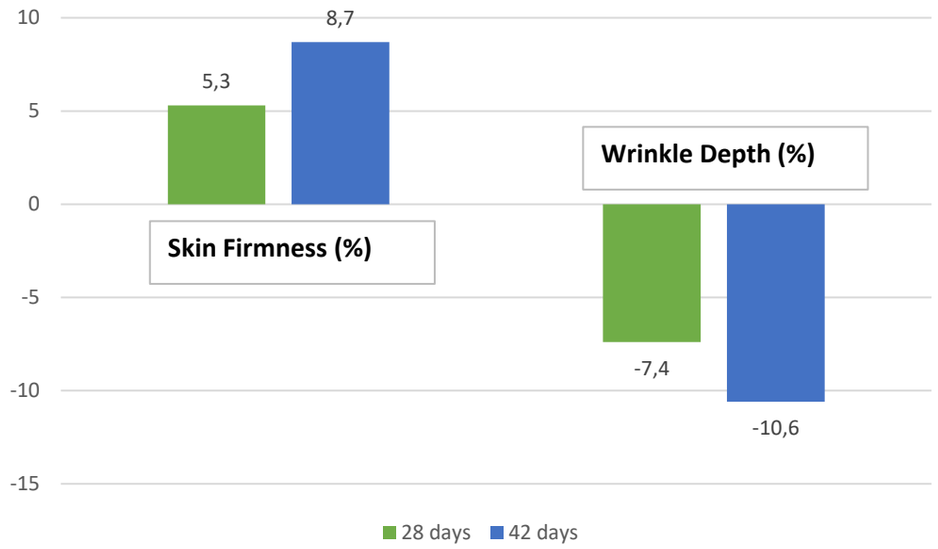
MATERIAL AND METHOD

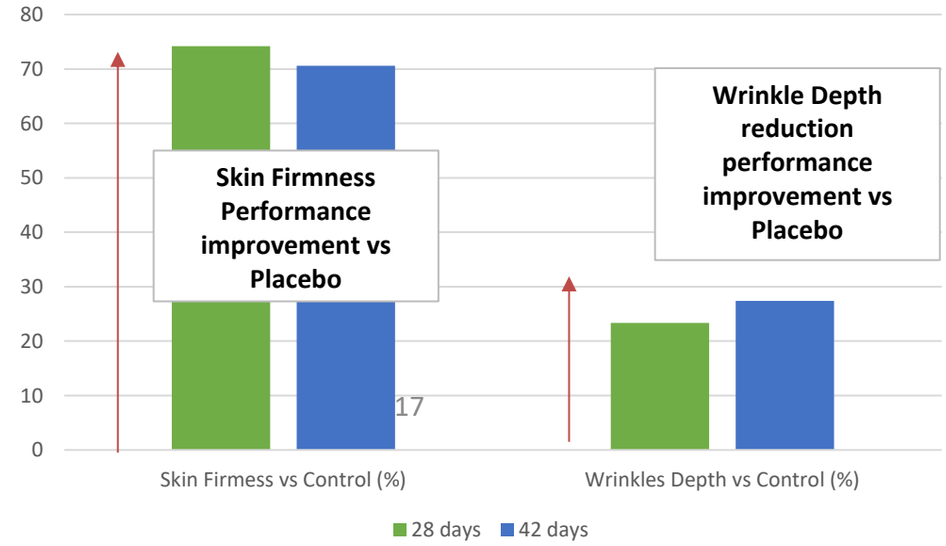
Fibroblast isolation: Normal human fibroblasts were obtained commercially.

Culture Conditions:. Cells were maintained at 37°C in a humidified atmosphere containing 5% CO_2.

Scrap test: At confluence, the cell mats are scraped and culture media were enriched with positive control (TGF-bêta, 10ng/mL) and EphyStem PID at concentrations ranging from 0,01% to 0,10% for 24h.

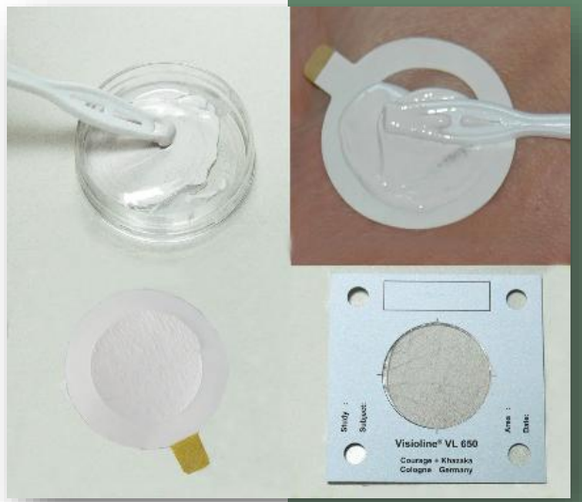
Data Analysis: At the end of the incubation period, recolonized surfaces are leasured by image analysis.





+ Clinical study

MATERIAL AND METHOD



Panel: A total of 15 persons, including men (33%) and women (67%), from 37 -58 years old.

Duration: 28 and 42 days.

Application instructions: Apply the prducts containing 1,5 % of Ephystem PID twice a day

Silflo® Replica: A white, non-glossy silicone material used to create skin replicas. This material captures the micro and macro relief of the skin surface, including wrinkles and deeper lines such as "crow's feet

+ *Clinical study*

MATERIAL AND METHOD

Panel: A total of 24 women from 50-70 years old.

Duration: 28 days.

Application instructions: Apply the product containing 1 % of Ephystem PID twice a day

Technical Specifications

INCI: Propanediol, Dimethyl isosorbide, Caesalpinia sappan (exosomes) extract

APPEARANCE: amber liquid

FORMULATION: Water-soluble

DOSAGE: 1-2 %

NOI: 1

SAFETY PROFILE:

- Cutaneous: Non-Irritating
- Eye irritation: moderate irritation
- Phototoxicity: not phototoxic
- Mutagenicity: non mutagenic ; non pro-mutagenic
- **Certified estrogen-like endocrine disruptors free**