# EPIDERMOSIL®

Skin restructuration
Anti-deep and superficial wrinkle
Moisturizer
Skin protection
Natural peeling
Alternative to surgery
Anti-psychological stress

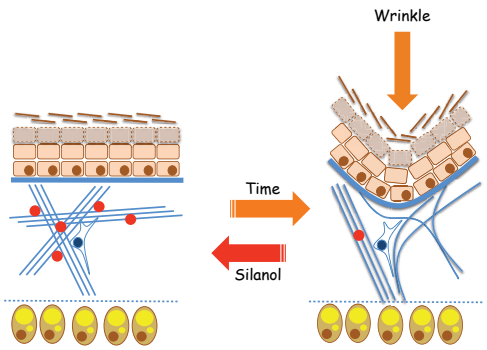
EXSYMOL
MONACO

# EPIDERMOSIL

## A SILANOL OF HYALURONIC ACID

### The silanol technology : skin restructuration

Silicium is an essential component of the skin. Indeed, by interacting with structure and elastic proteins within the dermis such as collagen fibers, elastin and proteoglycans, the silicium insures optimal skin organization and architecture.
However, with age the amount of silicium naturally present in the skin tends to decrease. As a result, an overall collapse of the skin architecture will happen, which will in turn induce skin metabolism slow down, inevitably leading to wrinkles.
EPIDERMOSIL is part of the silanol family.
It is a compound that possesses an organic silicium core.
A topic application of EPIDERMOSIL on the skin will therefore replenish the skin natural pool of organic silicium. The skin will be rejuvenated, better organized and structured. Ultimately, the skin will become visibly younger.




*Please refer to ALGISIUM leaflet for any further details about the SILANOL technology.*

### Hyaluronic acid and skin

Hyaluronic acid and skinHyaluronic acid (HA) is the most abundant glycosaminoglycan (GAG) within the skin. Because of its hydrophilic structure, HA's role is to maintain an optimal hydration level in skin. Native HA is naturally produced by skin cells, mainly as high (>2,000kDa) and low (150-600kDa) molecular weight biopolymers. The size of the polymer dictates its biological role on skin cells.

In EPIDERMOSIL, we chose to use low molecular weight HA which will trigger a virtuous circle leading to epidermis thickening.

By binding its receptor CD44 at the surface of the keratinocytes of the germinal layer, low molecular weight HA induces 3 reactions:

- Production of native HA by the keratinocytes
- Overexpression of CD44, the HA receptor, at the surface of these keratinocytes
- Proliferation of these keratinocytes

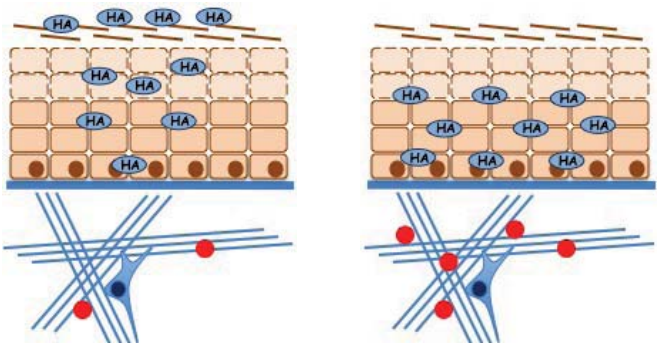
More keratinocytes that produce more HA and that express more of its receptor will further proliferate for yet a stronger production of HA. This is a virtuous circle that will lead to a quick thickening of the epidermis and a reduction of visible signs of aging.

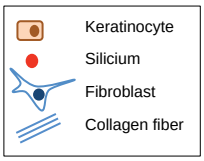
### SILANOLS as smart carriers for synergic benefits

In order to be effective, the organic silicium core needs to be maintained in its monomeric active form.
We therefore stabilized it using low molecular weight hyaluronic acid (HA), hence preventing its polymerization into inactive silicone.

While HA is stabilizing the organic silicium core, hence ensuring its activity, the organic silicium will in turn improve HA's activity. Because of its high affinity for the dermis tissue, the organic silicium will quickly go toward this skin compartment and, because it is bound to HA, it will drag it in the skin deepest layers hence improving its penetration.

As a result, there will be an optimal repartition of HA throughout the skin and more of it will reach the basal layer of the epidermis where it will bind its receptor CD44 for an improved activity.

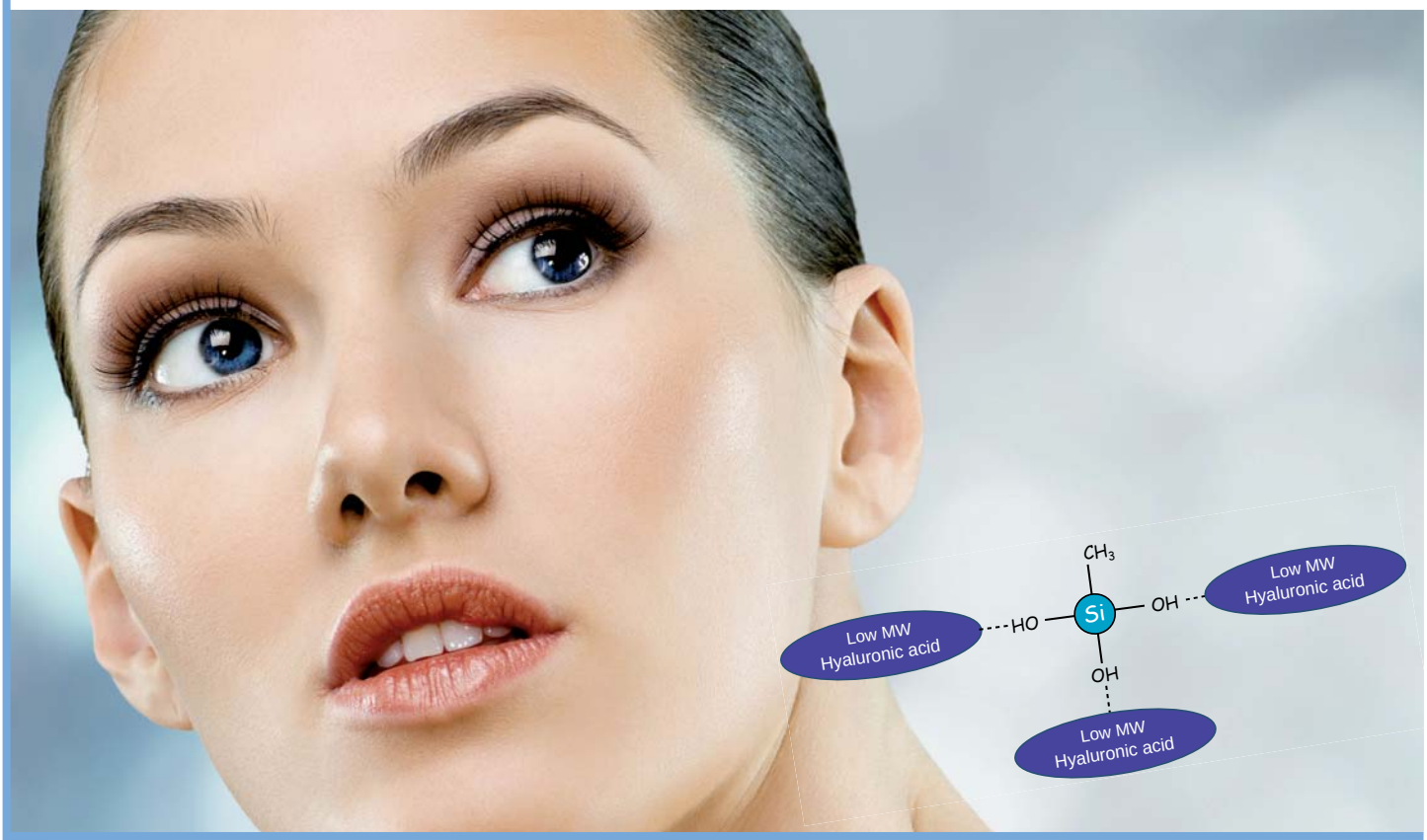



**Silanols as smart carriers.**
A. By itself, HA has a mild penetration and therefore activity.

B. With EPIDERMOSIL, HA is capable of reaching the basal layer of the epidermis and the skin is replenished with organic silicium.

# EPIDERMOSIL
## Applications




INCI name: SILANETRIOL (AND) HYALURONIC ACID

EPIDERMOSIL is a silanol that combines the restructuring benefits of the organic silicium and low molecular weight hyaluronic acid which is capable of stimulating keratinocyte proliferation within the epidermis.

## Skin benefits

- Stimulates collagen production
- Increases skin cell proliferation
- Increases skin cell survival
- Preserves skin hydration

## Cosmetic applications

### Beauty Care

- Anti-aging
- Anti-wrinkle
- Biological peeling
- Body firming

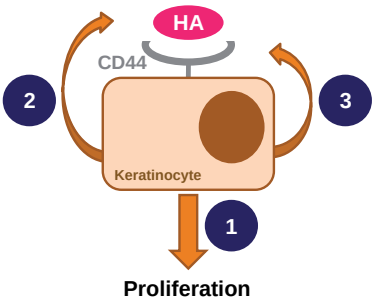
### Dermo cosmetic

- Alternative to botox and/or HA injections
- Anti-dehydration
- Skin protection
- Improves skin healing process

# EPIDERMOSIL
## The epidermis specialist

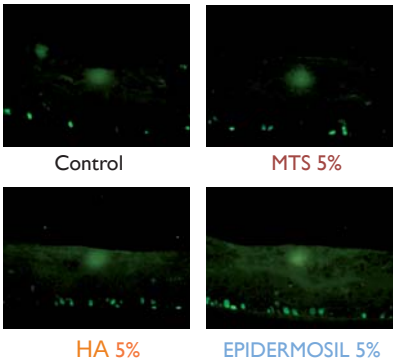
EPIDERMOSIL is capable of stimulating keratinocyte proliferation By enhancing low molecular weight hyaluronic acid penetration and bioavailability, a higher amount of HA is capable of binding its receptor CD44 at the surface of keratinocytes hence triggering three reactions:

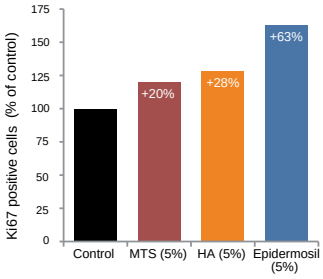
1. Keratinocyte proliferation that will lead to epidermis thickening
2. Keratinocyte production of HA
3. Overexpression of hyaluronic acid receptor CD44




## 1 Keratinocyte proliferation that will lead to epidermis thickening

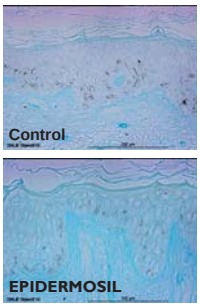
HRE were treated with silicium alone, with HA alone or with EPIDERMOSIL at the same concentration and the number of proliferating keratinocytes (Ki67 positive cells marked in green) was assessed. Both silicium and HA alone stimulate keratinocyte proliferation. EPIDERMOSIL has a stronger cytostimulating effect than both HA and silicium pooled together, hence showing the synergy created by this compound.

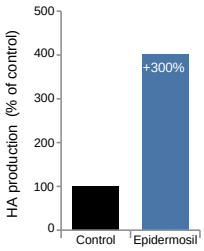



## 2 Keratinocyte production of HA

Human skin explants were treated with EPIDERMOSIL (5%) for 9 days. By the end of the treatment, the amount of HA (stained in blue) present in the skin was improved, suggesting a strong HA-induced HA production by the keratinocytes from the epidermis.

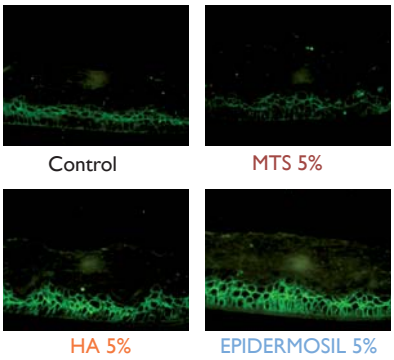


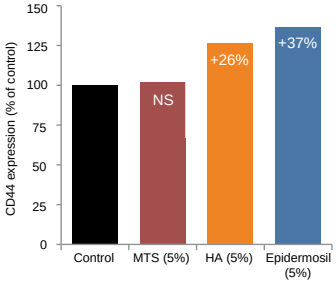




## 3 Overexpression of hyaluronic acid receptor CD44

Human reconstructed epidermis (HRE) were topically treated with silicium alone (MTS), HA alone or EPIDERMOSIL at the same concentration.

A stronger overexpression of CD44 (marked in green) was observed in the Epidermosil treated HRE.



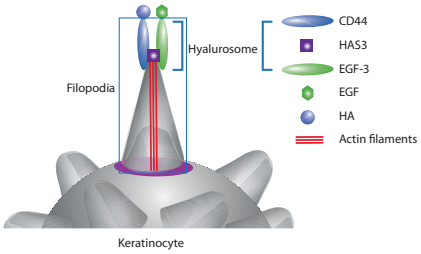



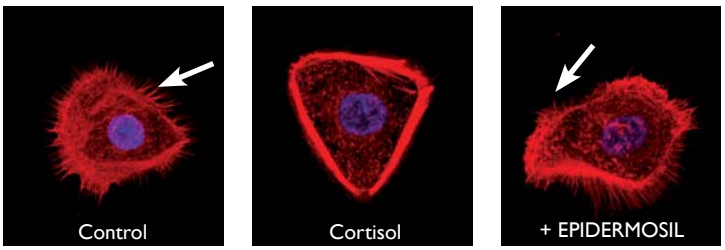

The benefits provided by EPIDERMOSIL are higher that the combination of organic silicium and HA together. This synergy is responsible for a strong cytostimulation of the keratinocytes, leading to a thickening of the epidermis for an improved protection and hydration of the skin.

# EPIDERMOSIL
## The epidermis specialist

## EPIDERMOSIL negates the effects of psychological stress on skin by protecting filopodia and preserving the hyalurosome

Psychological stress is mediated by cortisol. This hormone will have a dual effect on skin via its specific effect on keratinocytes' filopodia. Filopodia are cell overgrowth that are responsible for ensuring keratinocyte mobility and response to hyaluronic acid via the hyalurosome. They are therefore key for the cytostimulation, healing and hydration processes.



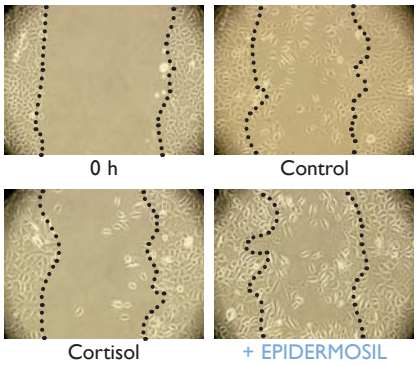

While cortisol is responsible for dramatically decreasing the filopodia's length, the treatment with EPIDERMOSIL is capable of strongly increasing their length. EPIDERMOSIL is therefore capable of opposing the noxious effects of psychological stress on skin.

## EPIDERMOSIL improves the wound healing process

### Wound healing and cortisol

Filopodia ensure the cell mobility which is a key mechanism in the wound healing and regeneration processes

By decreasing filopodia length, psychological stress leads to a decrease in the skin healing process.

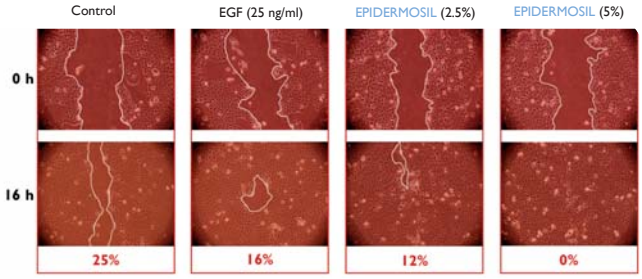



EPIDERMOSIL is capable of opposing the effects of cortisol on keratinocytes and is therefore able to restore their mobility and their proliferation for an optimal skin healing and regeneration.

### Wound healing and aging

The healing process depends on both keratinocyte proliferation and migration. Treatment of keratinocytes in a scratch test assay showed that the "wound" was closed faster and more efficiently in the presence of EPIDERMOSIL.

This clearly shows that EPIDERMOSIL is capable of improving the healing process by stimulating keratinocyte proliferation rate and mobility.




*EGF = Epidermis Growth factor (positive control)

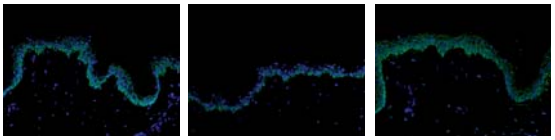
## EPIDERMOSIL improves skin protection and hydration

### EPIDERMOSIL ensures skin hydration

In order to assess EPIDERMOSIL's ability to protect the skin from dehydration and to help it recovering from a severe stress, we exposed human skin explants to acetone.

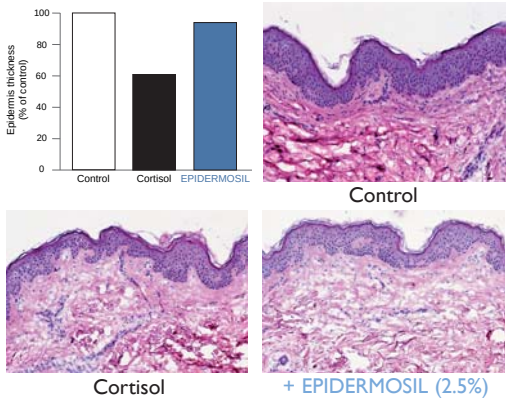
Aquaporin-3 is a protein responsible for the creation of transmembrane pores which allow water transport across cell membranes. As a result, aquaporin-3 ensures optimal moisturization in the epidermis.

Because of acetone exposure aquaporin-3 (in green) is strongly inhibited and a treatment with EPIDERMOSIL (5%) completely restores its optimal expression. Similar results were observed for other key proteins in the hydration process such as filaggrin and loricrin.




### Cortisol causes dehydration and a loss of protection

Filopodia are home to the hyalurosome where the binding of hyaluronic acid to its receptor CD44 occurs. By affecting filopodia, psychological stress thus leads to a thinner epidermis.




EPIDERMOSIL is capable of protecting the hyalurosome from the effects of cortisol. It therefore allows an optimal response to hyaluronic acid that will lead to a thicker epidermis.

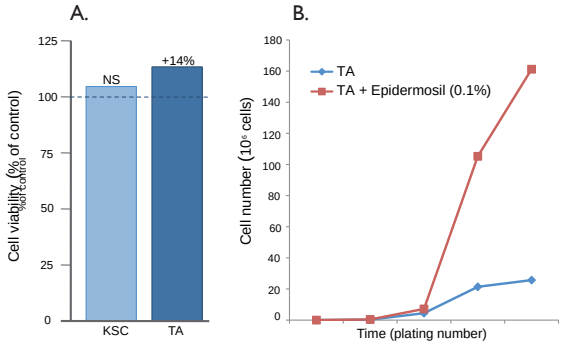
# EPIDERMOSIL

## Global benefits for anti-aging effect

### EPIDERMOSIL specifically targets TA cells for enhanced proliferation

Keratinocyte stem cells (KSC) are quiescent cells that rarely proliferate. When they do, they usually produce another KSC and a transient amplifying cell (TA).
KSC have a limited proliferation quota and thus should not be stimulated as they form the pool of proliferating cells. On the other hand, TA are responsible for proliferating and are therefore an optimal target for any skin treatment.

EPIDERMOSIL specifically targets TA cells and is capable of improving their proliferation rate (**A**), and of increasing their ability to proliferate for a longer period of time (**B**).

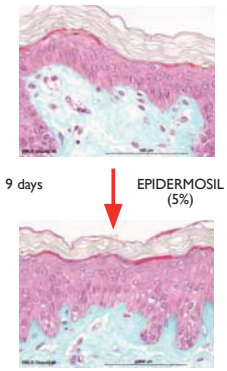


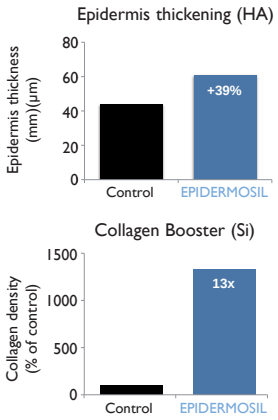

### EPIDERMOSIL: synergetic effect for global skin benefits

As a result of all the benefits provided by EPIDERMOSIL, a treatment with this compound provides the skin with global improvements at all levels:

**- The epidermis is thicker and of a better quality for higher skin protection and a reduced trans epidermal water loss (TEWL).**

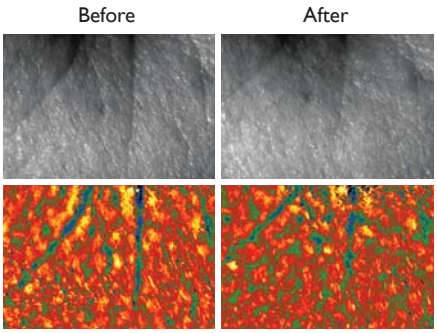
**- The dermis is denser for a more resistant, flexible and elastic skin.**

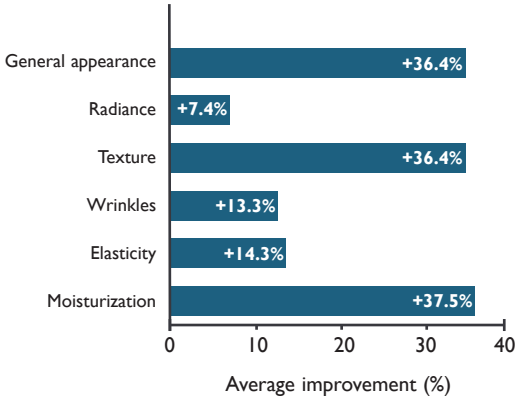


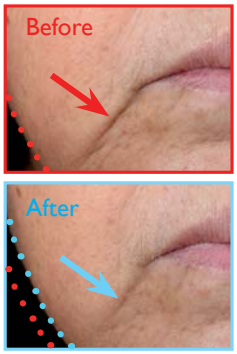




### Clinical test with EPIDERMOSIL

Realized under dermatological control, a clinical trial was performed on 35 women aged 40 to 59.
The volunteers received a treatment with EPIDERMOSIL (5%) applied twice a day on the face for 28 days.




The plumping benefits from both organic silicium and the low molecular weight hyaluronic acid led to a decrease of wrinkle depth and to an improvement of skin elasticity together with a high hydration level.
**100 % of volunteers had a general skin improvement with a healthier, younger looking skin.**

# EPIDERMOSIL
## Technical characteristics

### ANALYTICAL COMPOSITION

| | |
|---|---|
| Methylsilanetriol | 0.3% |
| including silicium | 0.09% |
| Low molecular weight hyaluronic acid | 0.35% |
| Water (sq) | 100% |

### PHYSICO-CHEMICAL CHARACTERISTICS

Limpid to slightly opalescent, colorless to yellowish liquid
pH ≈ 5.5
Density at 20°C ≈ 1.0
Miscible with water, opalescent in alcohols
Not miscible in oils.

### PRESERVATIVES

Different preservative systems are available in order to fit with your requirements. Please contact us for additional details about the available versions.

### TOLERANCE AND TOXICITY STUDIES

EPIDERMOSIL is perfectly tolerated. Tolerance and toxicity studies were performed using both *in vitro* (cell culture and reconstructed epidermis) and *in vivo* (human volunteers) methods.

### FORMULATION

Advised doses: 3 to 6%.
Incompatibilities: No particular formulation restriction.

### AVAILABILITIES

EPIDERMOSIL is available in 5 and 30 kg drums.

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