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Matrixyl® 3000

MATRIXYL® 3000 is a combination of 2 matrikines*:

- Pal-GHK (Palmitoyl-Gly-His-Lys)
- Pal-GQPR (Palmitoyl-Gly-Gln-Pro-Arg).

Matrikines are peptidic cell messengers resulting from the degradation of the extracellular matrix.

They interact with specific receptors to activate genes involved in the process of wound healing: fibroblast recruitment, cell proliferation, keratinocyte setting and anchoring, extracellular matrix synthesis and micro vascularisation.

Pal-GHK and Pal-GQPR act in order to repair the cutaneous damages of ageing.

** F.X. Maquart et al. in: Current Topics of Pathology 93, 95-101, A. Desmolière et al. Eds, Springer Berlin 1999.*

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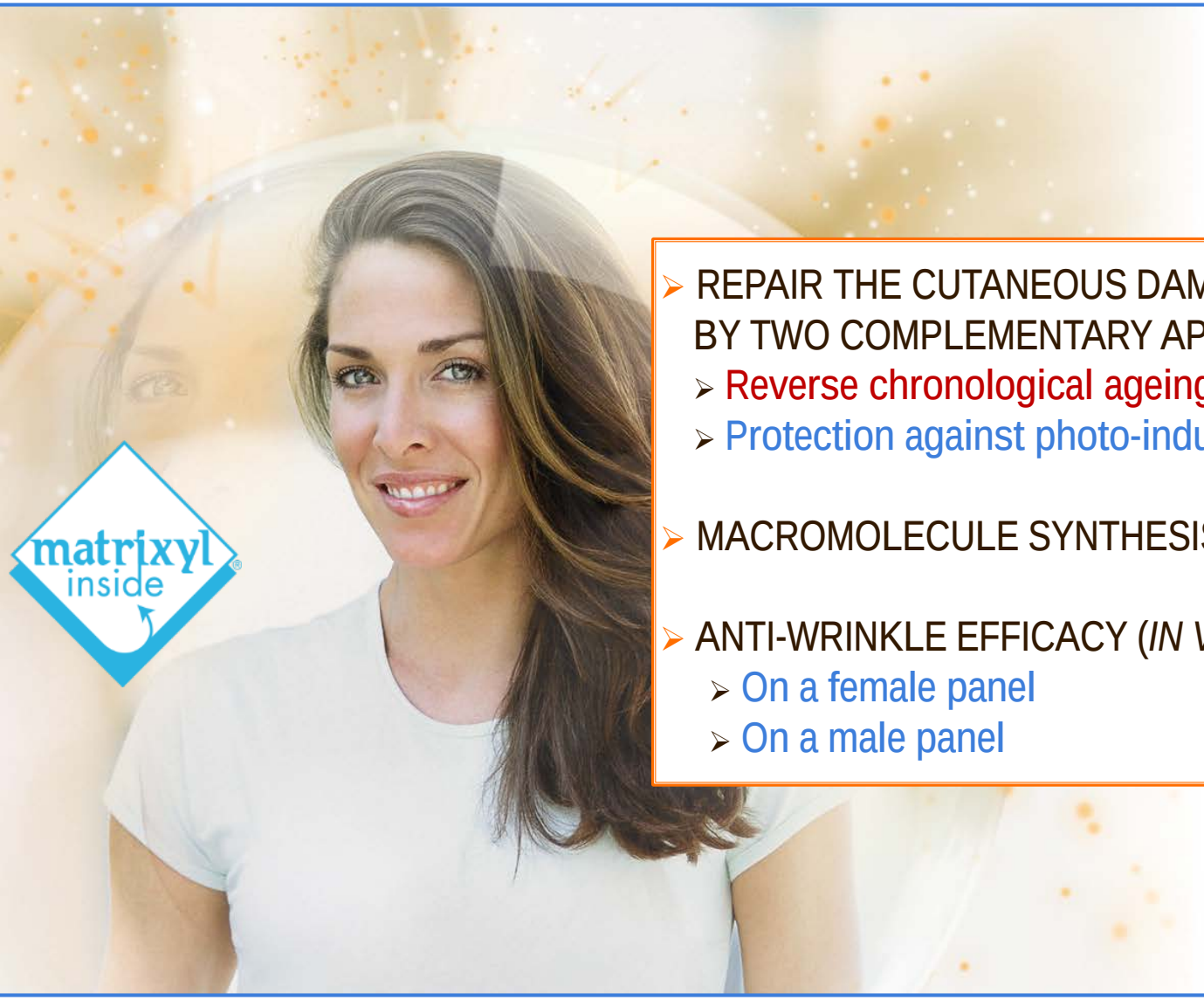

matrixyl inside

NEW TEST

- REPAIR THE CUTANEOUS DAMAGES OF AGEING BY TWO COMPLEMENTARY APPROACHES:
  - Reverse chronological ageing *(IN VITRO – EX VIVO)*
  - Protection against photo-induced ageing *(IN VIVO)*
- MACROMOLECULE SYNTHESIS (*IN VITRO*)
- ANTI-WRINKLE EFFICACY (*IN VIVO*)
  - On a female panel
  - On a male panel

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REPAIR THE CUTANEOUS DAMAGES OF AGEING BY TWO COMPLEMENTARY APPROACHES

REVERSE CHRONOLOGICAL AGEING

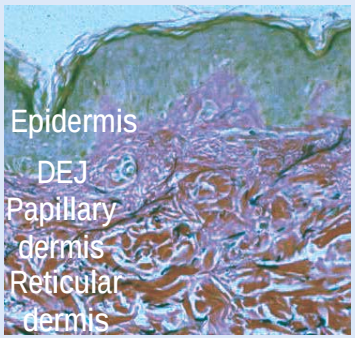
NEW TEST

progerin

Like SA β-galactosidase, **progerin**, an altered form of the lamin A protein, is a senescence marker. With age, its expression rises, as well as the skin tissue disorganisation.

- Senescence markers *(IN VITRO)*
- Rejuvenate the dermal structure *(EX VIVO)*
  - Analysis of the impact of age on the synthesis of dermal-epidermal junction (DEJ) components

PHOTO-INDUCED AGEING PROTECTION



Intensely affected by photo ageing due to its localisation and as key element for the whole skin integrity, the protection of the **papillary dermis** is fundamental to fight against ageing.

- Repair of the papillary dermis *(IN VIVO)*
  - Analysis of the Subepidermal Low Echogenicity Band (SLEB) and of the fibre network

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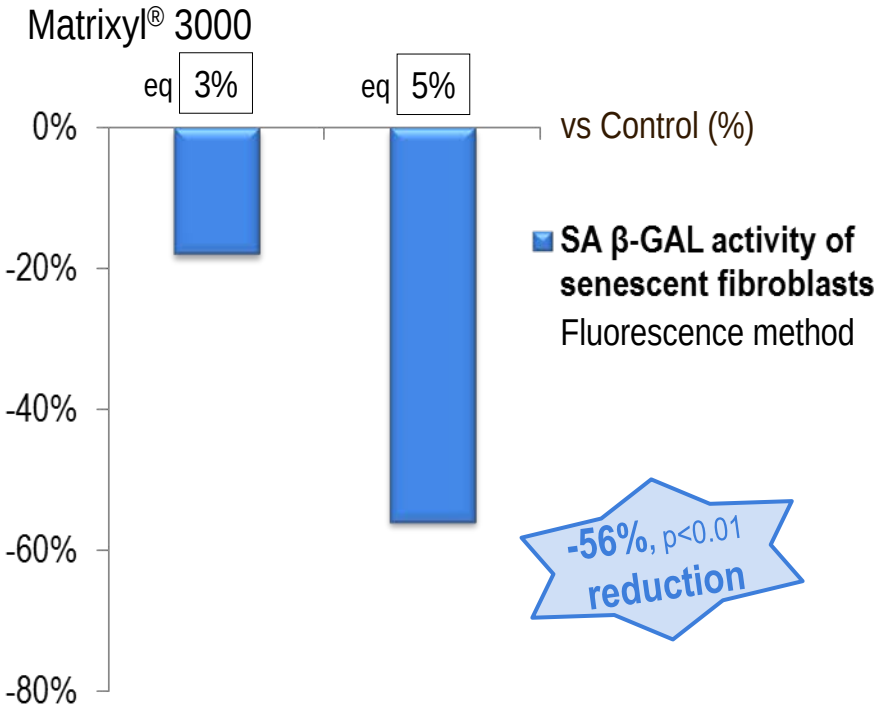
IN VITRO

NEW TEST

REVERSE CHRONOLOGICAL AGEING

MATRIXYL® 3000 has been shown to regulate the expression of well-known (SA **β-galactosidase**) and recently discovered (**progerin**) markers of senescence.

➢ SA β-galactosidase



MATRIXYL® 3000 reduces of 56% the SA β-galactosidase activity known to be particularly high during cellular senescence.

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Matrixyl® 3000

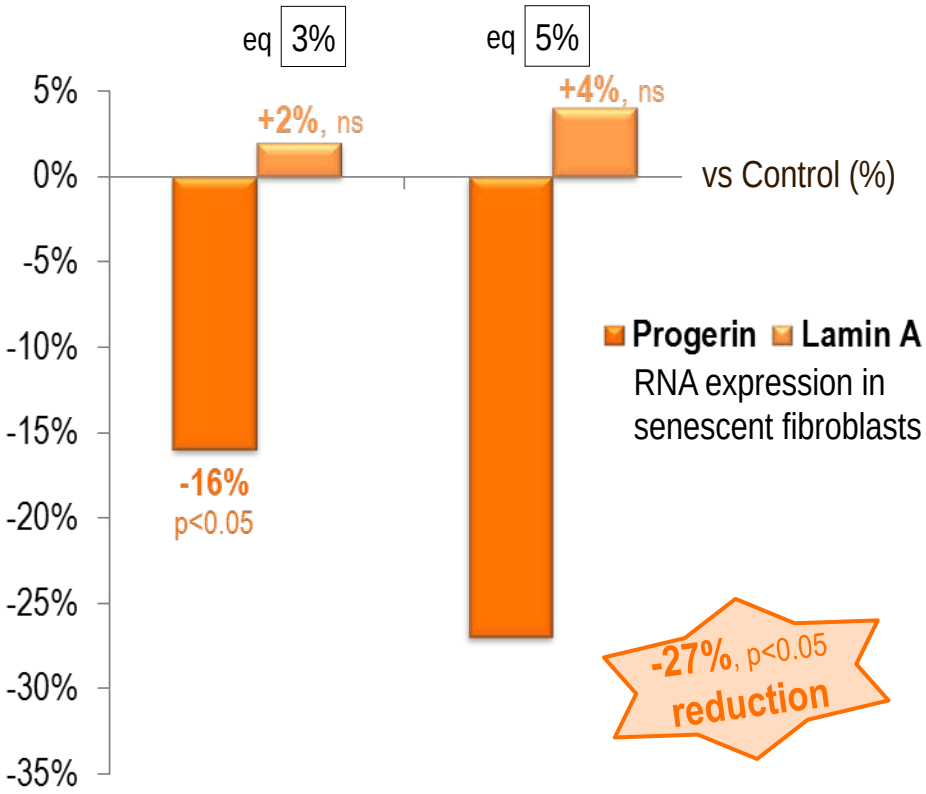
IN VITRO

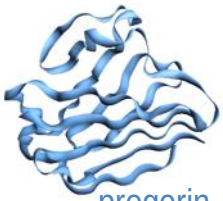
NEW TEST

REVERSE CHRONOLOGICAL AGEING

Progerin / Lamin A

Matrixyl® 3000





progerin

Lamins are key proteins in the skin's regenerative process. Progerin is an altered form whose expression rises at the same time as skin ageing signs appear and intensify.

To know more about the alterations of the DEJ with age

MATRIXYL® 3000 reduces of 27% the progerin's expression while preserving the expression of the normal form lamin A.

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EX VIVO

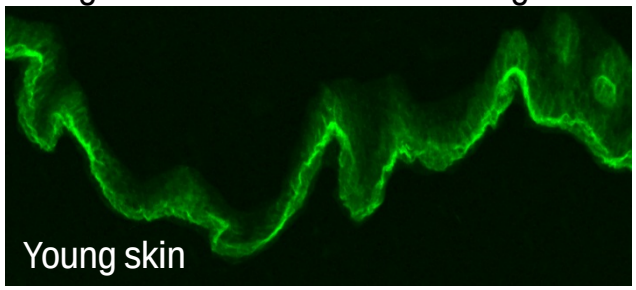
NEW TEST

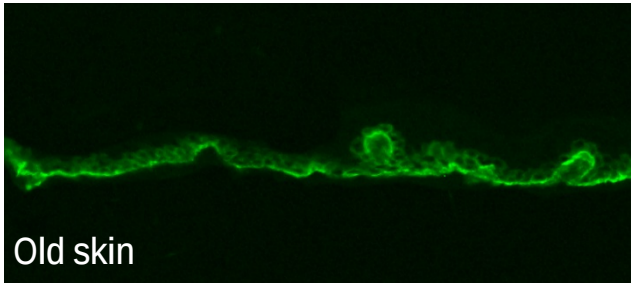
REVERSE CHRONOLOGICAL AGEING

Immunohistochemistry analysis of skin sections performed in the Sederma Laboratories

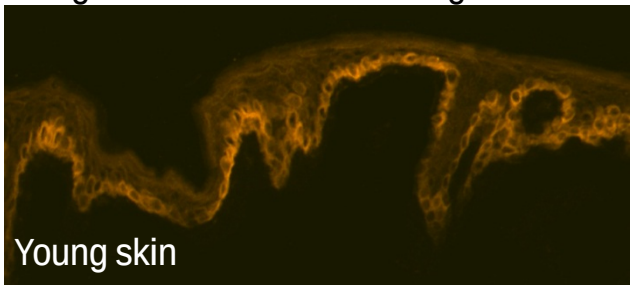
With age, the skin is characterised by connective tissue disorganisation: lower quantity of cohesion proteins (lower fluorescence intensity) and flattening of the dermal-epidermal junction.

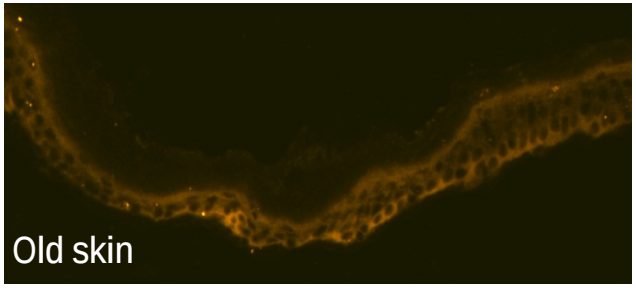
Collagen XVII fluorescent labelling





Nidogen I fluorescent labelling





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➢ REJUVENATE THE DERMAL STRUCTURE *(EX VIVO)*

Protocol

Immuno-staining, labelling and **labelling intensity quantification of collagen-I, -IV, -VII, -XVII and nidogen-I:**

- On 10 skin explants (0.5 cm^2, Biopredic), obtained from abdominal region of Caucasian women and distinguished in two age groups (both n=5 ; Aged group: mean 61+/-5 years and Young group: mean 36+/- 6 years).

- Daily application on the above 10 skin explants, for 5 days of a cream containing 3% MATRIXYL® 3000, against a placebo cream.

➢ Analysis of the impact of age and benefits of MATRIXYL® 3000 on the synthesis of DEJ components

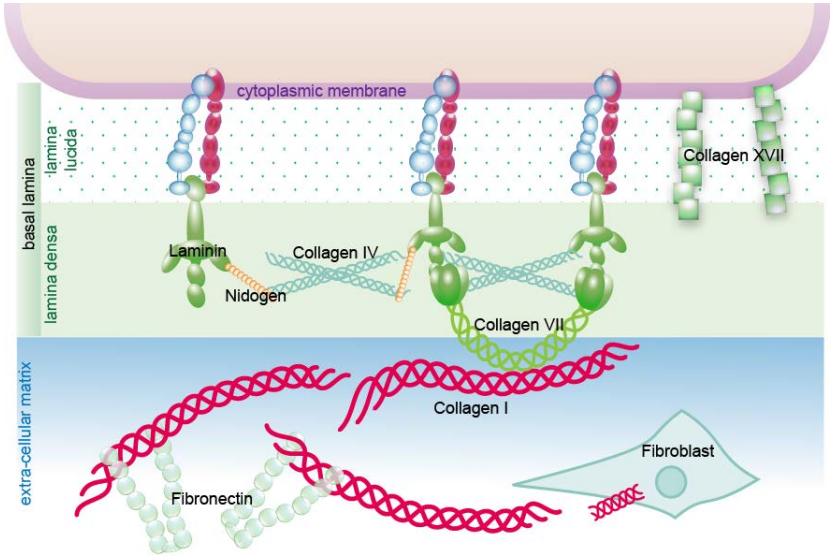
Matrixyl® 3000

EX VIVO

NEW TEST

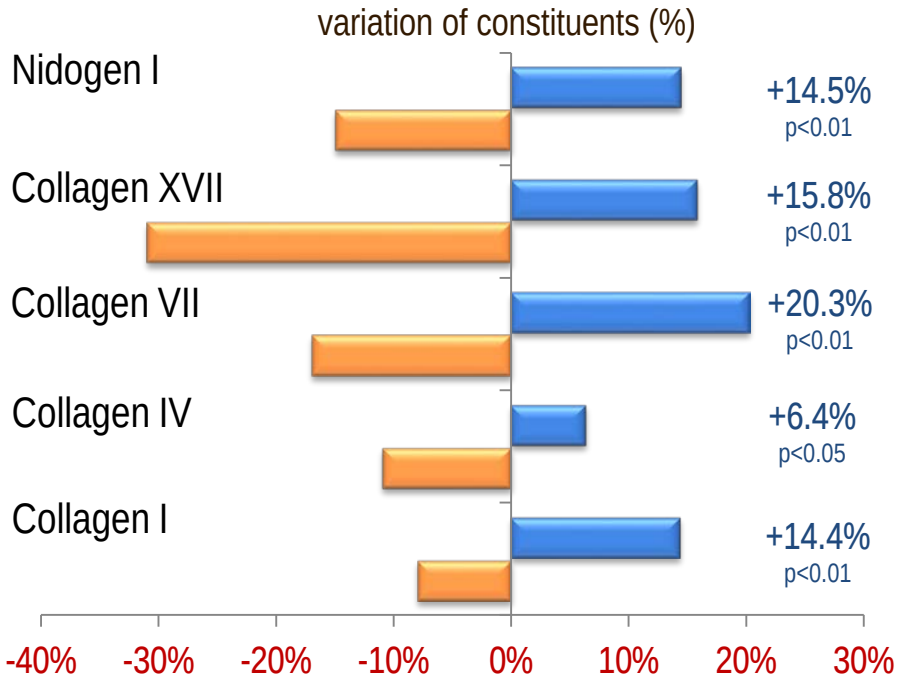
REJUVENATE THE DERMAL STRUCTURE

With age, constituent proteins of the dermis (C-I), anchorage and cohesion proteins (C-IV, C-VII, C-XVII and NO-1) of the DEJ significantly decreased.



Aged vs Young skin explants

MATRIXYL® 3000 3% vs Placebo



By increasing the C-I, C-IV, C-VII, C-XVII and NO-I synthesis on skin explants, MATRIXYL® 3000 helps reverse the chronological ageing.

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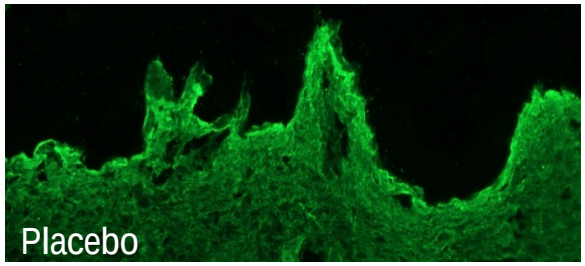
EX VIVO

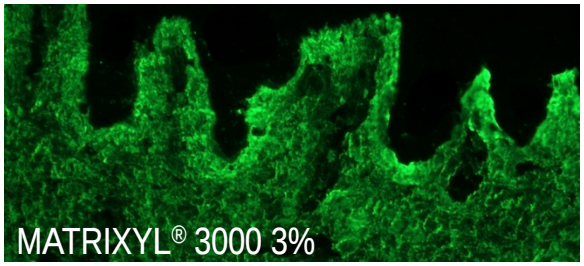
NEW TEST

REVERSE CHRONOLOGICAL AGEING

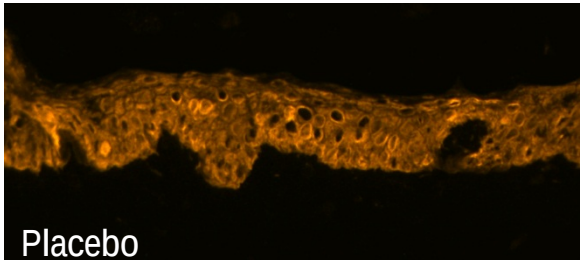
Immunohistochemistry analysis of skin sections performed in the Sederma Laboratories

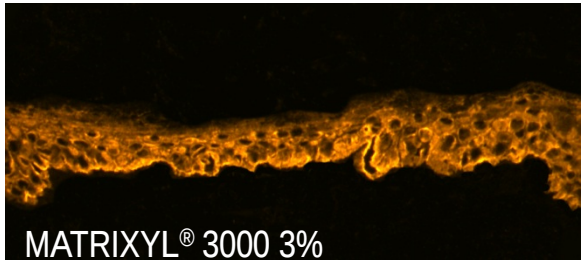
Collagen I / MATRIXYL® 3000 vs Placebo : +14.4%, p<0.01





Collagen-VII / MATRIXYL® 3000 vs Placebo : +20.3%, p<0.01





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PROTECTION AGAINST PHOTO-INDUCED AGEING

The papillary dermis is more fragile than the reticular dermis and is intensely affected by photo ageing.

- ⇨ Papillary fibroblasts vitality is impaired
- ⇨ Epidermal morphogenesis capacity is altered
- ⇨ Quantity of cell receptors decreases
- ⇨ Reduction and disorganisation of the major MEC components (free water)

Young papillary network

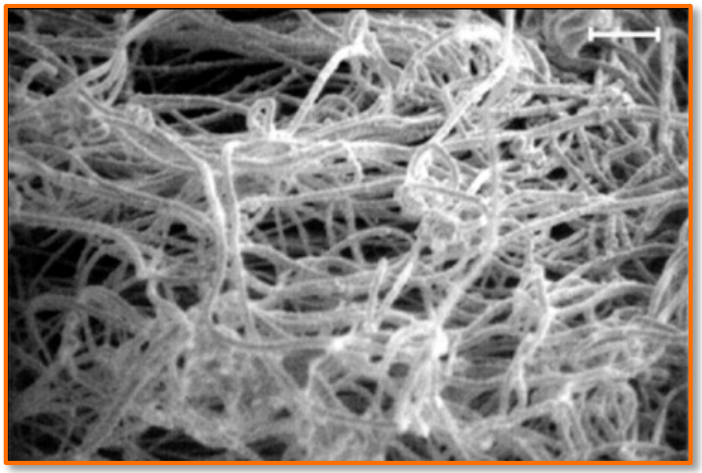
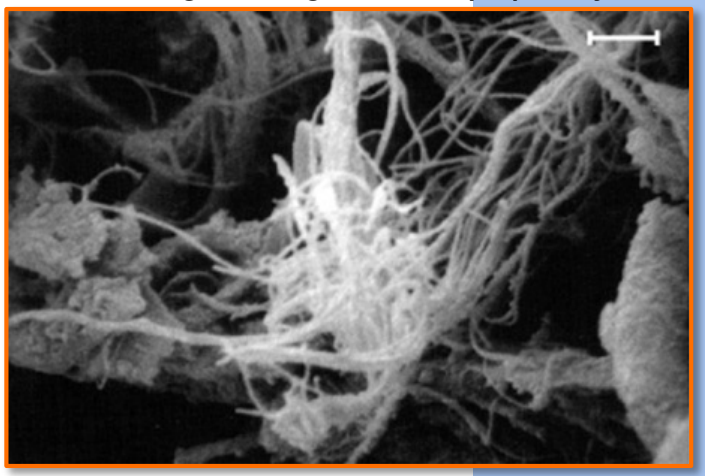


Photo damaged fragmented papillary network



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➢ PAPILLARY DERMIS REPAIR

Protocol

28 female volunteers aged from 51 to 72 years old (mean age: 59). Twice daily application of a cream containing 3% MATRIXYL® 3000 for 2 months on one half of the face and the inner and UV-exposed outer forearm, against placebo.

➢ Analysis of the SLEB

- SLEB density
- SLEB thickness

High resolution echography (on the inner and outer forearm)

➢ Analysis of the fibre network

- Improvement of the papillary dermal fibre fragmentation

Confocal laser microscopy (on the face next to the eye external corner)

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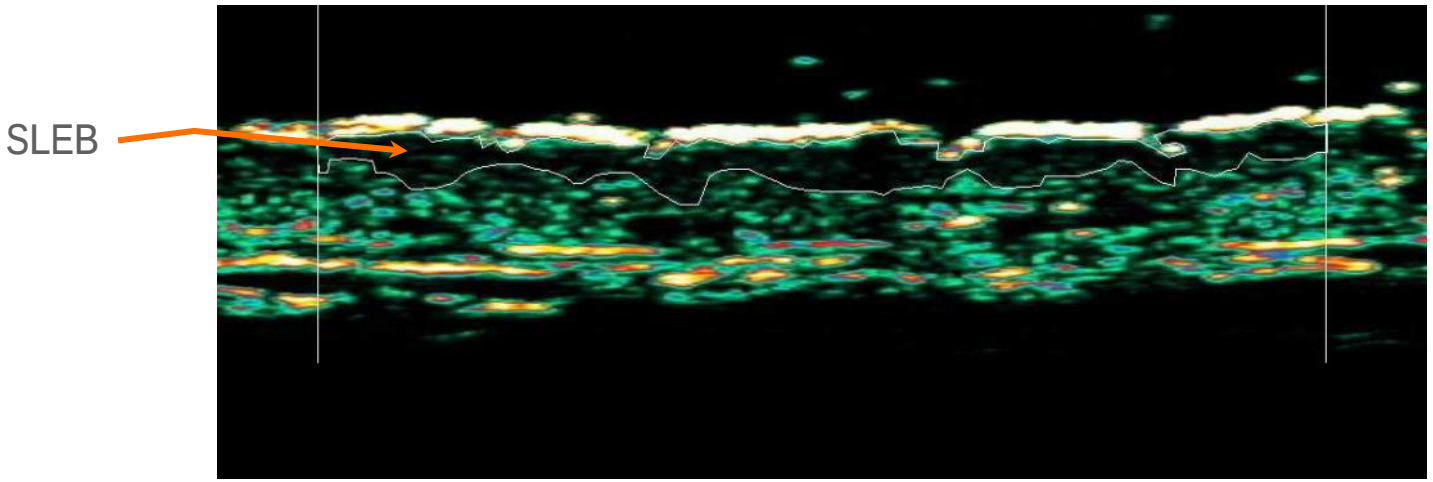
ANALYSIS OF THE SLEB

SLEB is the **Subepidermal Low Echogenic Band** observed by **echography**. It is located under the dermis/epidermis junction (DEJ) and corresponds to the papillary dermis. Its thickness tends to increase with age and sun damage whereas its echogenicity decreases, revealing the fibre network disorganisation.
Product applications and measurements are performed on both inner and outer forearm sites; the inside of the forearm being slightly exposed to sunlight whereas the sun exposure to the outside of the forearm is strong.



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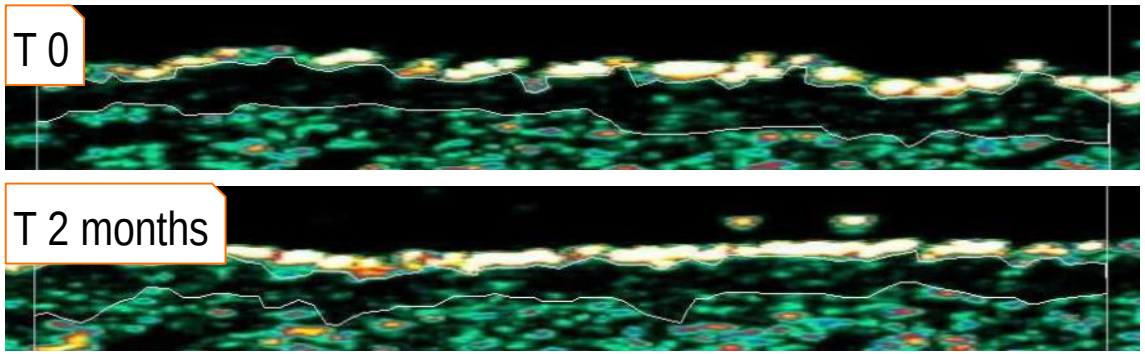
IN VIVO

ANALYSIS OF THE SLEB

Improvement of the SLEB density

Measurements of density by echography on the inner and outer forearm.

Density after 2 months	Inner forearm	Outer forearm
Density T0→T2	18.88 AU → 21.03 AU	16.57 AU → 18.48 AU
Variation/T0	+11.4% up to +44%, p<0.01 68% volunteers with improvement	+11.5% up to +45%, p<0.01 82% volunteers with improvement
Variation/placebo	+15.2%, p<0.01	+15.1%, p<0.01



By increasing the SLEB density, MATRIXYL® 3000 demonstrates its capacity to reinforce the structure of the papillary dermis.

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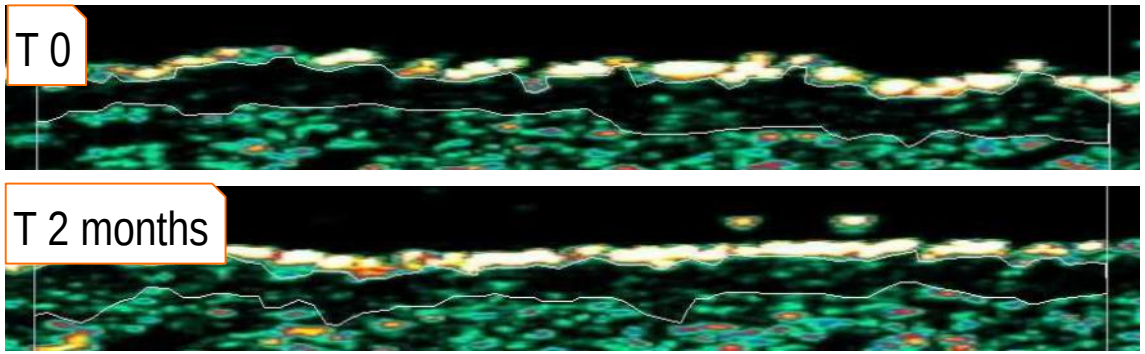
ANALYSIS OF THE SLEB

Improvement of the SLEB thickness

Measurements of thickness by echography on the inner and outer forearm.

Thickness (µm) after 2 months	Inner forearm	Outer forearm
Thickness T0→T2	176 µm → 159 µm	193 µm → 174 µm
Variation/T0	-9.8% up to -23%, p<0.01 93% volunteers with improvement	-9.8% up to -33%, p<0.01 86% volunteers with improvement
Variation/placebo	-11%, p<0.01	-14.4%, p<0.01



Significant improvement of the SLEB characteristics **visible in just one month** (thickness: -5.5%/placebo, inner arm) and confirmed after 2 months.

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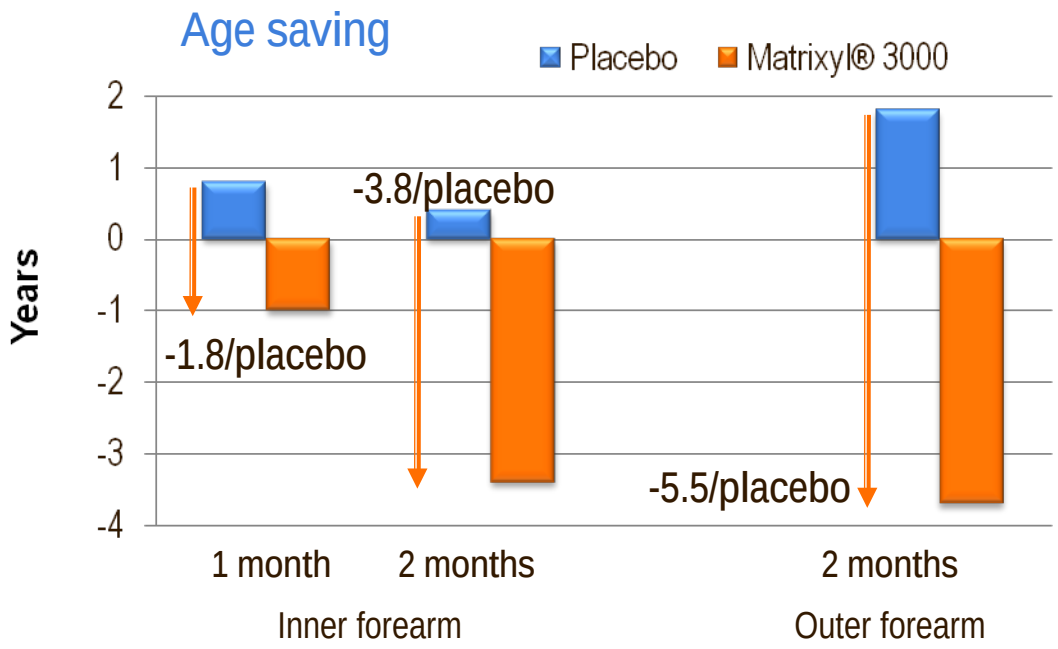
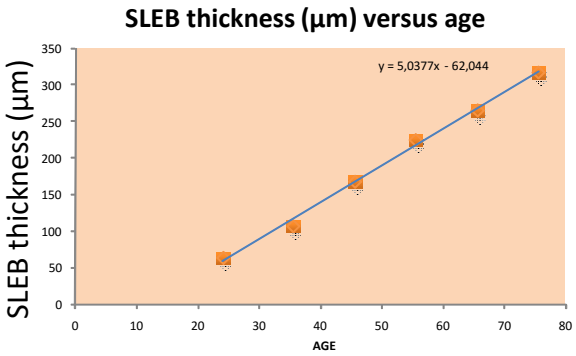
ANALYSIS OF THE SLEB

Improvement of the SLEB thickness

The SLEB thickness is closely connected to the age.





From Querleux *et al*, 2009.

The photo-induced ageing is delayed by 5½ years in 2 months!

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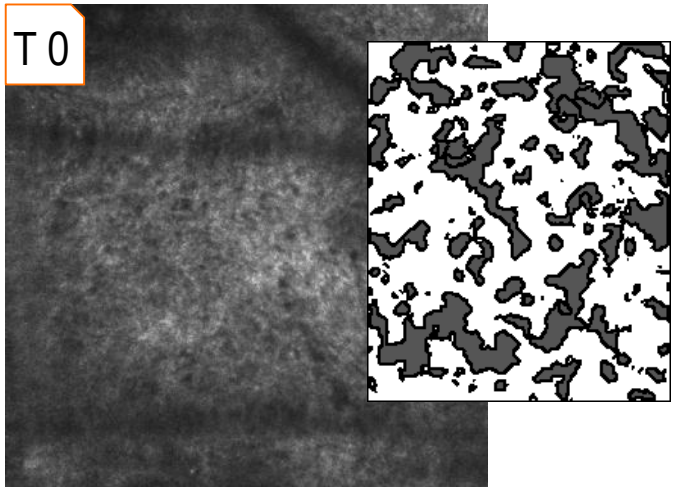
IN VIVO

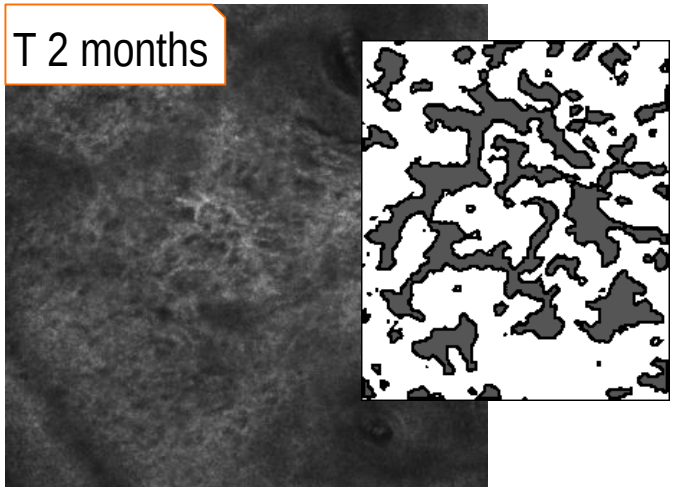
ANALYSIS OF THE FIBRE NETWORK

Improvement of the dermal fibre organisation

Measurements of the fibre defragmentation by confocal laser microscopy.

Improvement	T 1 month	T 2 months
Variation/T0	+11.1% up to +64%, p<0.05 64% of volunteers had an improvement.	+13.9% up to +54%, p<0.01 71% of volunteers had an improvement.
Variation/placebo	+6.6%, p=0.27	+13.2%, p<0.05





MATRIXYL® 3000 helps reduce the fibre fragmentation and notably supports the reconstruction of the papillary dermal fibre network.

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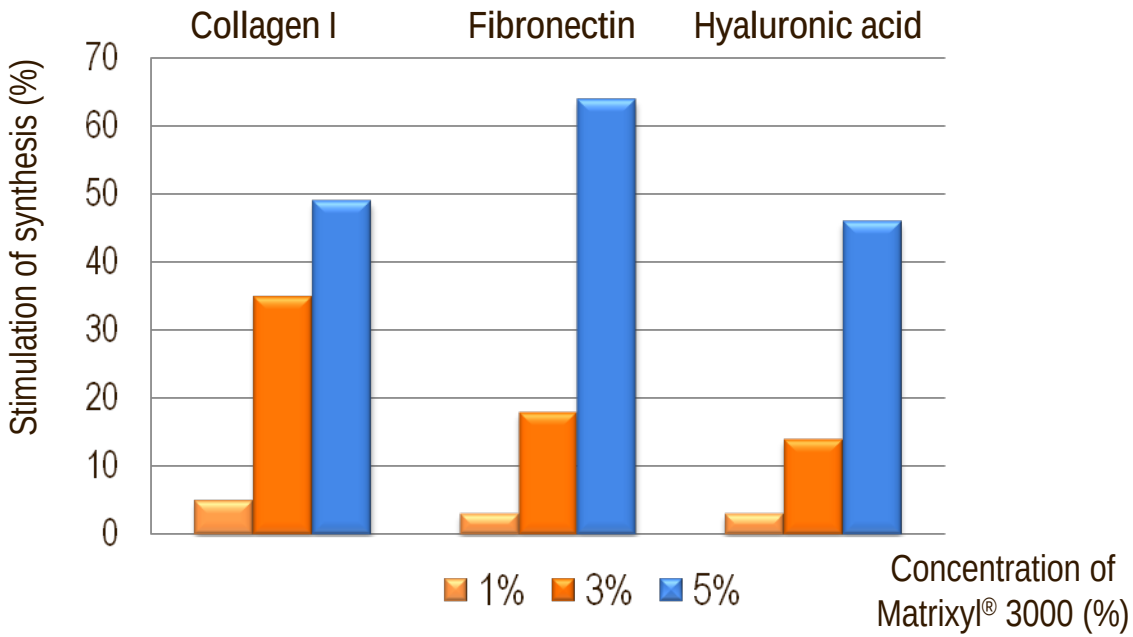
IN VITRO

ECM CONSTITUENTS SYNTHESIS

Stimulation of the matrix molecule synthesis *in vitro*

A test on human fibroblast culture. Incubation for 72 hours with MATRIXYL® 3000.
Evaluation of collagen I and fibronectin synthesis by ELISA method.
Evaluation of hyaluronic acid synthesis by colorimetry.



MATRIXYL® 3000 stimulates the synthesis of extracellular matrix molecules.

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Matrixyl® 3000

Anti-wrinkle efficacy

On female panellists

23 female volunteers, mean age: 56.1 years old.
Twice daily application of a cream containing 3% MATRIXYL® 3000 for 2 months on one half of the face against placebo.

On male panellists

39 male volunteers, mean age: 54.5 years old.
Twice daily application of a cream containing 4% MATRIXYL® 3000 for 2 months on one half of the face against placebo.

T0	T 2 months
Silflo®	Silflo®
Photos	Photos
Cutometry	Cutometry

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Anti-wrinkle efficacy on female panellists

Variation of parameters compared to T0 (%)	MATRIXYL® 3000	Placebo
Surface occupied by deep wrinkles (>200 µm)	-39.4**	+4.3^{ns}
Wrinkle density (µm/cm²)	-32.9**	-9.9^{ns}
Main wrinkle average depth (µm)	-19.9**	-3.2^{ns}
Main wrinkle average volume (mm³)	-23.3**	-8.7*
Roughness (µm)	-16.0**	-1.4^{ns}
Lifting effect (complexity)	-16.2**	+4.2^{ns}
Elasticity (n=24)	+5.5*	4.1^{ns}
Skin tone (n=24)	+15.5**	6.5^{ns}

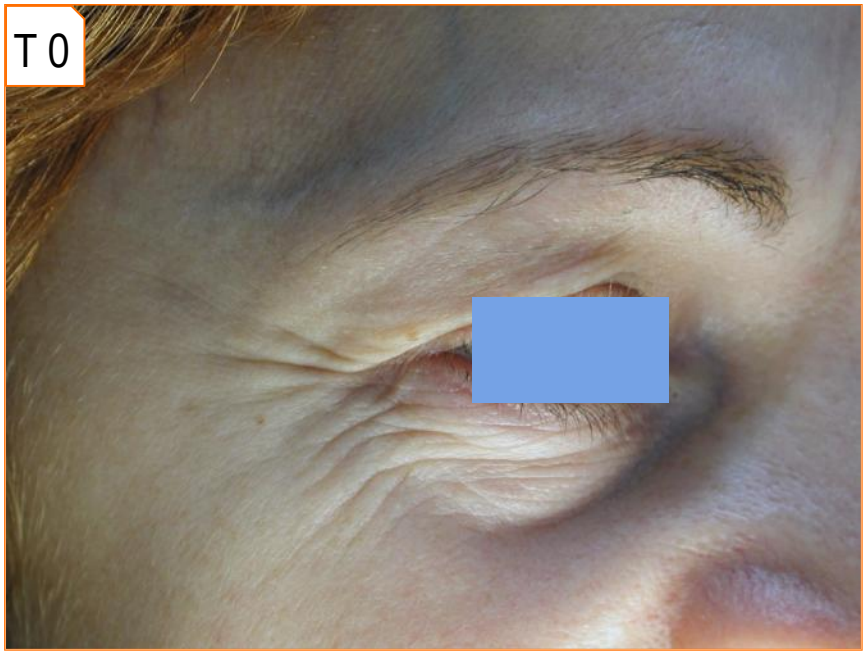
n.s.: non significant *: significant/T0, p≤0.05 **: significant/T0, p≤0.01

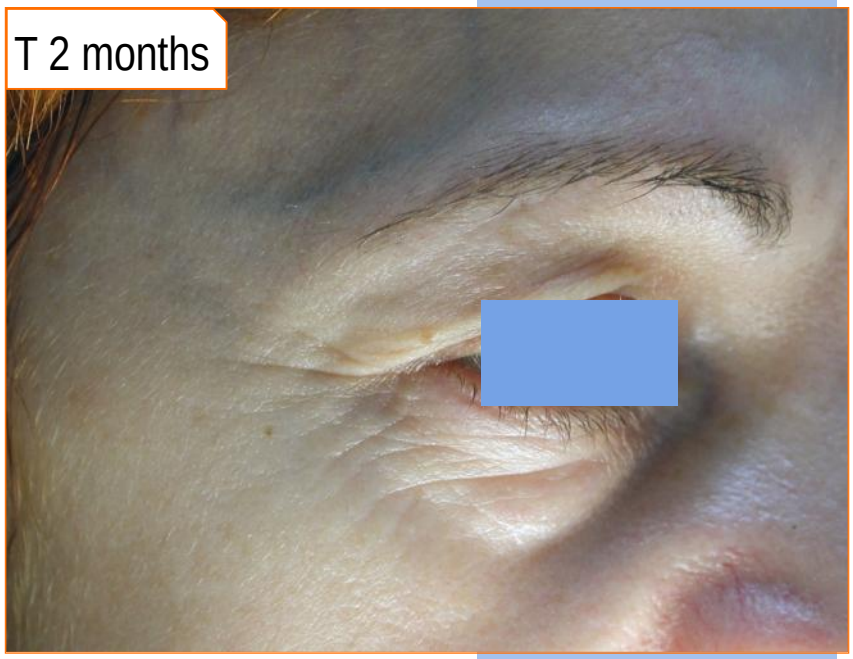
Matrixyl® 3000

IN VIVO

BEAUTY BENEFITS

Anti-wrinkle efficacy on female panellists





The repairing effect of MATRIXYL® 3000 promotes the visible quality of the skin by decreasing the appearance of wrinkles and improving tone and elasticity.

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Anti-wrinkle efficacy on male panellists

Variation of parameters compared to T0 (%)	MATRIXYL® 3000	Placebo
Surface occupied by deep wrinkles (>200 µm)	-29.4**	+5.1$^{n.s.}$
Main wrinkle density (µm/cm²)	-30.4**	-19.7$^{n.s}$
Main wrinkle average depth (µm)	-10.2**	+0.2$^{n.s}$
Main wrinkle average volume (mm³)	-17.1**	-2.7$^{n.s}$
Roughness (µm)	-8.4**	-2.2$^{n.s}$
Wrinkle spread (angle)	+5.4*	-0.7$^{n.s}$

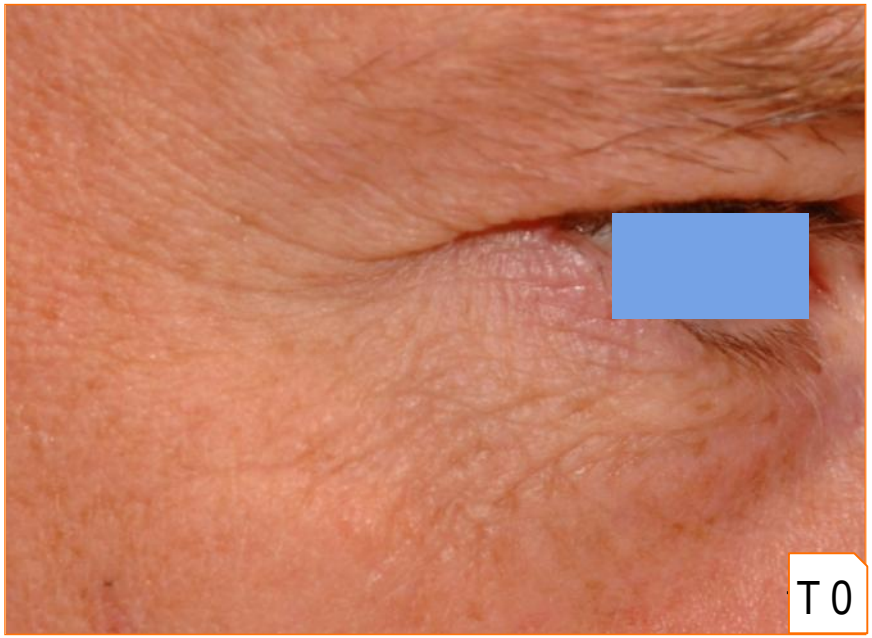
n.s.: non significant *: significant/T0, p≤0.05 **: significant/T0, p≤0.01

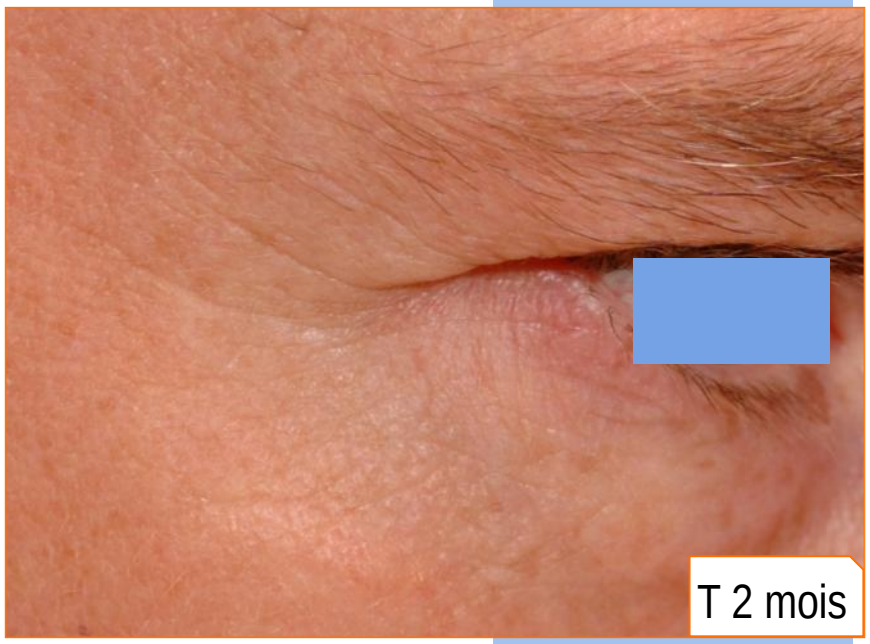
Matrixyl® 3000

IN VIVO

BEAUTY BENEFITS

Anti-wrinkle efficacy on male panellists





MATRIXYL® 3000 helps smooth significantly male skin.

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Matrixyl® 3000

NEW TEST

MATRIXYL® 3000 is an anti-ageing ingredient based on the matrikine technology.

MATRIXYL® 3000 helps:
- reverse the chronological ageing as attested by the regulation of senescence markers. Ageing skin tends to behave like young skin.
- reduce the cutaneous photo damage by restructuring the fragile network of the papillary dermis.

The ageing process is slowed down by 1.8 years in just 1 month to 5.5 years in 2 months.

The effects of MATRIXYL® 3000 on wrinkles and skin quality are visible after 2 months for both men and women. Recommended use of MATRIXYL® 3000 is between 3% and 5%.

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Matrixyl® 3000

NEW TEST

reveals age gain by

2 years in just 1 month

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