



# RENESEED™

THE SEED OF YOUTH



in-cosmetics®  
global

Innovation Zone  
Best Ingredient  
Award 2020

SHORTLISTED

## Beauty & Australian endemic plants

A-Beauty, emerging trend focused in the use of endemic Australian plants

- High efficacy & multifunctional products (more benefits & less worries)



# Wild plants as biofactories

## *N. Benthamiana*

- Native plant of Australia
- Plant model system for the transient expression of peptide, polypeptide and proteins(50-380 aa)

## Transient expression

- Synthetic human gene cloned into an expression vector, transcribed *in vitro* into mRNA and inserted through the leaves into the cytoplasm of vegetal cells while nuclei remains untouched (natural plant expression system)

↳ **NON-GMO**



Controlled conditions

Closed environment

No pesticides

# Wild plants as biofactories



## TRANSIENT EXPRESSION

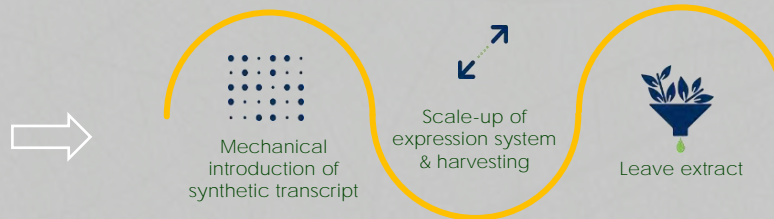
Synthetic human gene cloned into an expression vector, transcribed *in vitro* into mRNA and inserted through the leaves into the cytoplasm of vegetal cells while nuclei remains untouched (natural plant expression system)

*N. benthamiana* is a plant model system for the transient expression of peptides, polypeptides and proteins (50-380 aa)

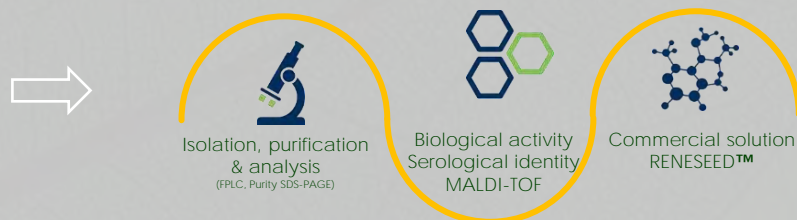
### 1. SYNTHETIC GENE CLONING



### 2. NATURAL SYNTHESIS OF PROTEIN & EXTRACTION



### 3. PURIFICATION & ANALYSIS

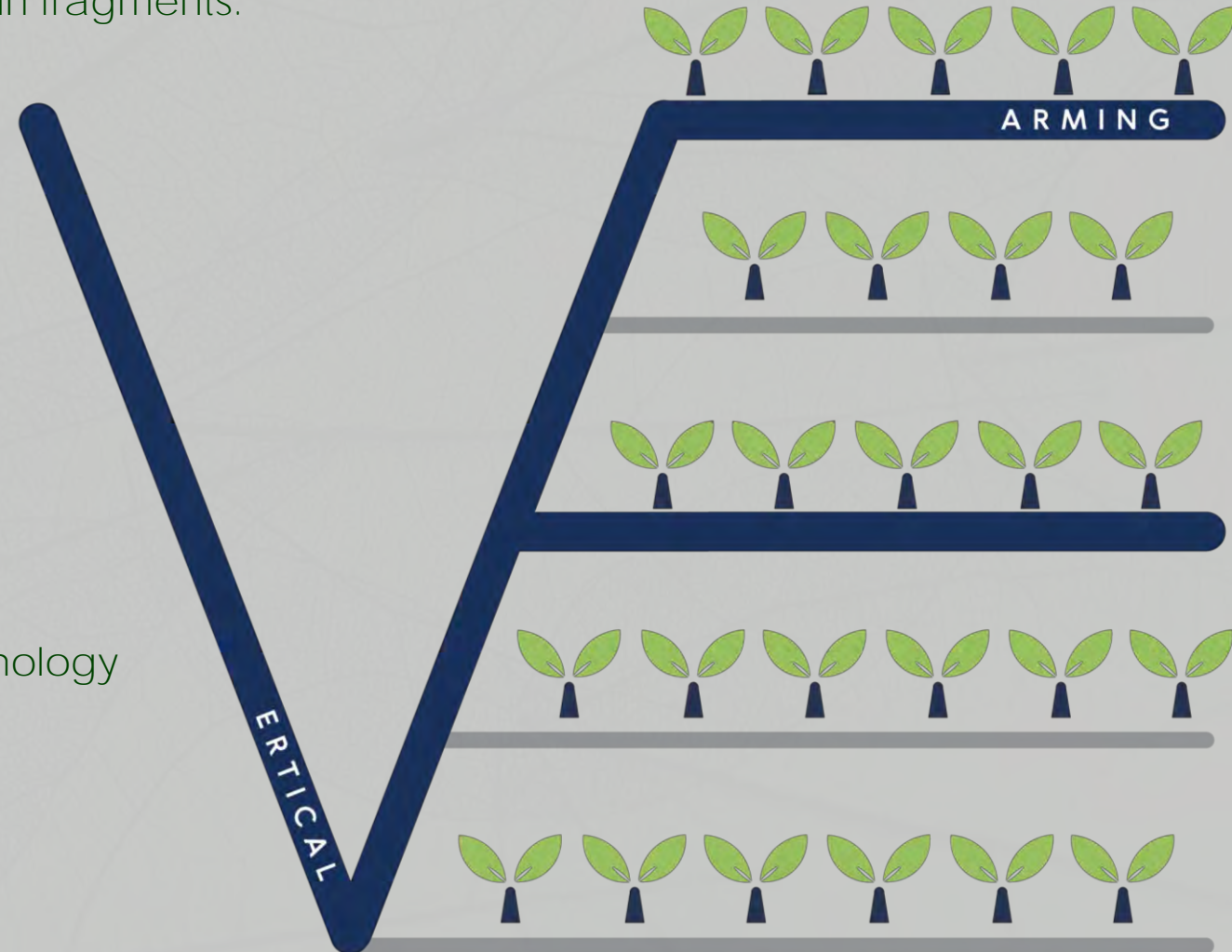


# Wild plants as biofactories. Vertical Farming

- Production in plants of biomimetic proteins or protein fragments.
- Vertical farming
- Technology: transient expression (non-GMO)

## ADVANTAGES OF WILD PLANTS AS BIOFACTORIES

- ✓ Biomimetic to human
- ✓ High activity → Proper post-translational modifications (PTMs)
- ✓ High purity molecules
- ✓ Endotoxin-free
- ✓ Non-GMO
- ✓ Sustainable technology
- ✓ Vegan certified



# Vertical Farming: Sustainability

## VERTICAL FARMING ADVANTAGES

- Closed & protected environment
- Optimization of water, energy & space (indoor vertical farming)
- Controlled conditions: temperature, light (LED lights) & ventilation
- No pesticides

## SUSTAINABILITY

- Recycling of used soil (sterilization for use in conventional crops or gardens)
- Use of biodegradable plant pots
- Solar panels installment
- Optimization of water consumption & recycling after treatment for irrigation and agricultural & industrial purposes



[Click to view video](#)

Using the latest research in plants' photobiology by NASA & mRNA technology

## The seed of youth

Round, flat, long or oval, plant seeds come in different shapes & appearances, just like us. Nevertheless, all seeds have something in common, with them a plant life is started.

A simple seed contains all the nutrient storage & information to wake up from its dormant stage and sprout to life as a new plant.

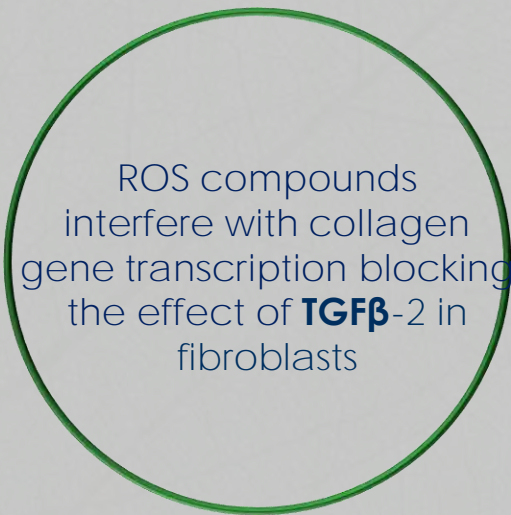
Discover Reneseed™, the seed of youth to wake up your dormant beauty & rejuvenate your skin



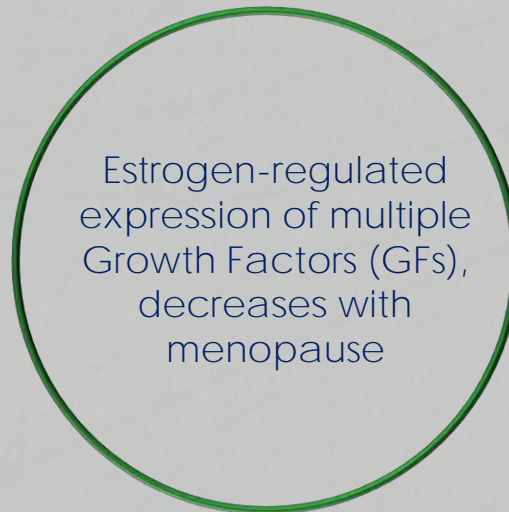
## Reneseed™ & Aging

- Well-**balanced TGFβ signaling** is essential to sustain the skin in a healthy and functional condition and overall to support maintenance of a young appearance. However, the aging process affects TGF-β levels and activity

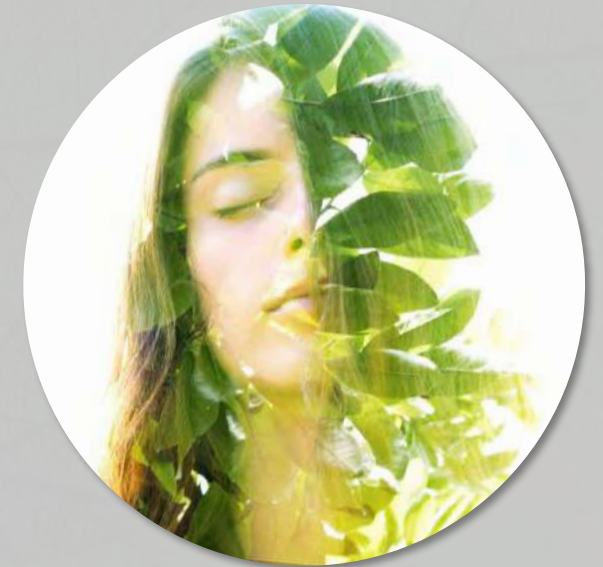
PHOTOAGING, SMOKE,  
ALCOHOL, DIET, STRESS



HORMONAL AGEING  
(ex. MENOPAUSE)

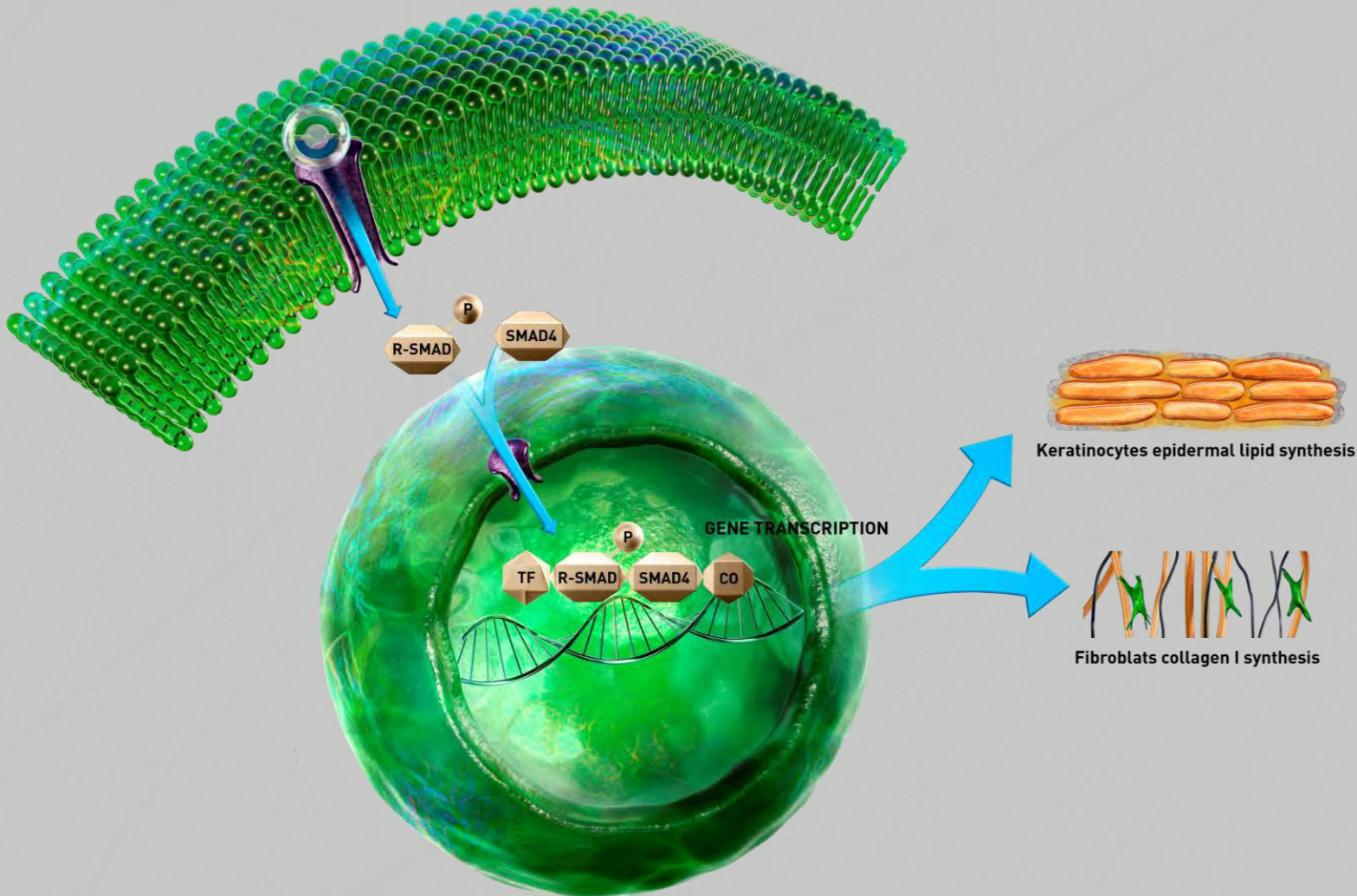


Recovers your own beauty that is sleeping inside of you





# Reneseed™, The seed of youth



Skin benefits  
(Keratinocytes & fibroblasts)

Skin integrity improvement

↑Lipids gen expression  
(ABCA12, K1, ALOXE3,  
CERSA1, PNPLA1, FLG)



Collagen I synthesis

Collagen booster  
Retinol & Retinoic acid like  
activity  
Synergistic effect with retinol  
& retinoic acid



Phototoxicity

↓Phototoxicity vs Retinol &  
Retinoic acid



Epidermal thickness & Lipids

↑Epidermal thickness  
↑Neutral lipids synthesis

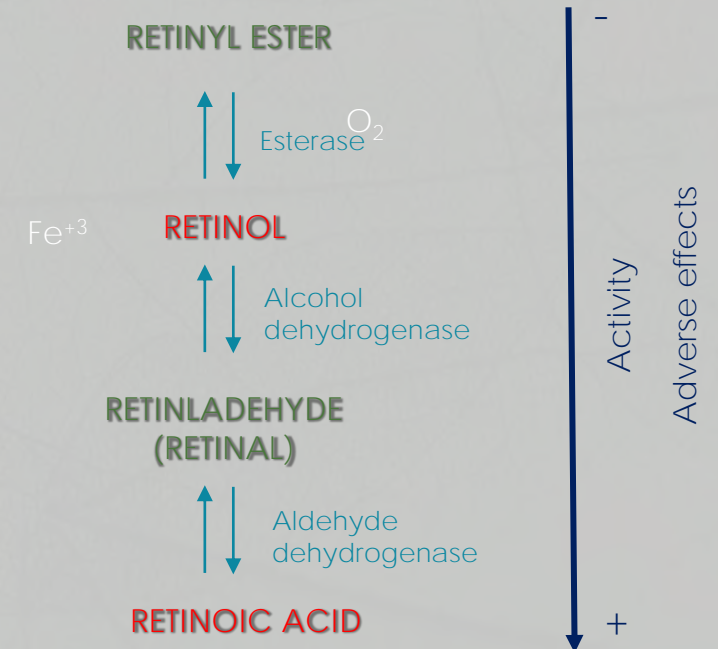


# Reneseed™ & Retinoids, Plant-based retinoids alternative

Reneseed™ is a retinoid-like since both retinoids and TGFbs participate in the activation of the SMADs metabolic pathway leading to the production of collagen I



## SKIN METABOLISM OF RETINOIDS



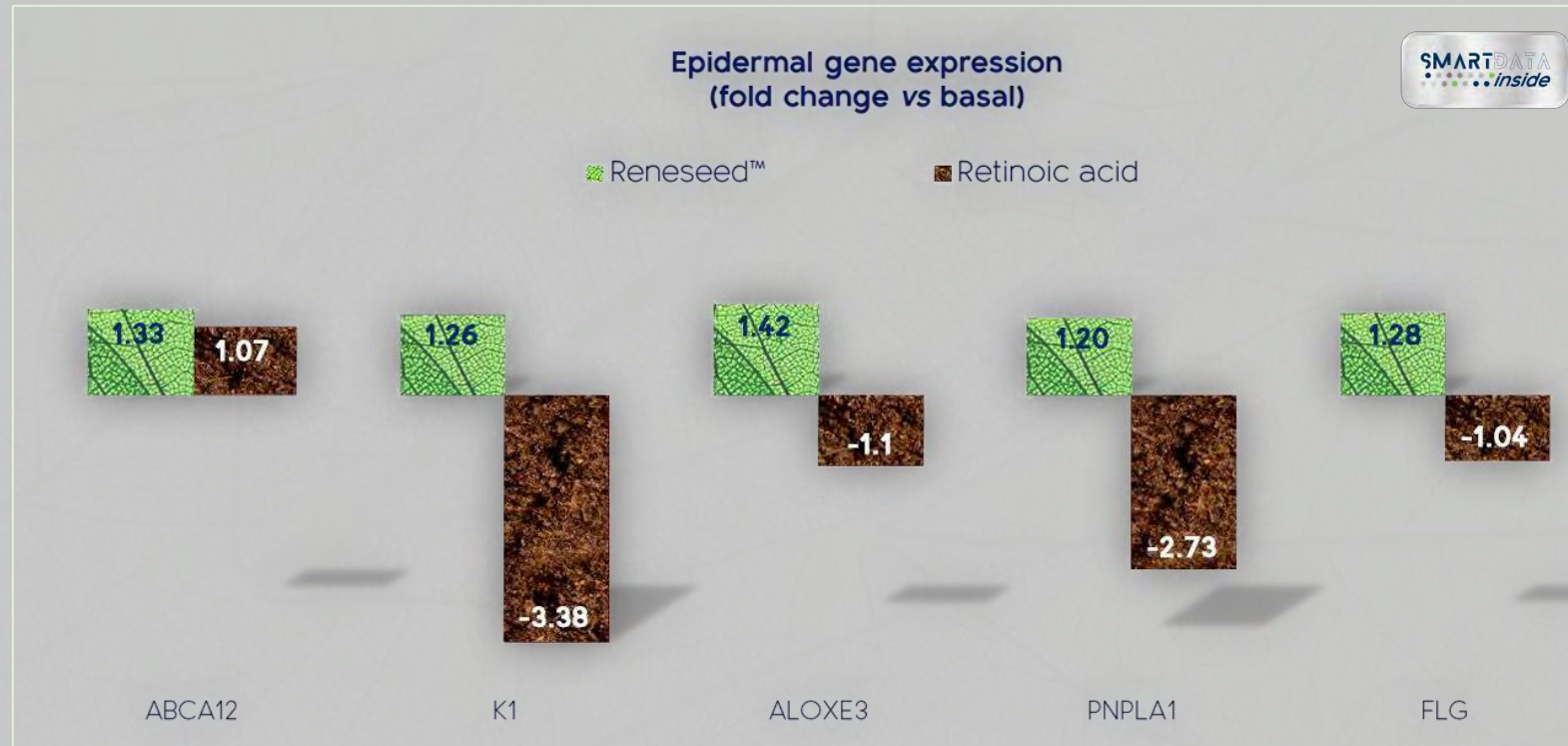
PARAMETER	RENESEED™	RETINOIC ACID	RETINOL
Collagen booster	✓	✓	✓
Epidermal lipids	✓	✗	✗
Day skin treatments	✓	✗	✗
Skin photosensitivity	✓	✗	✗
Chemical stability	✓	✗	✗

## Reneseed™, The seed of youth

- Retinol & Retinoic acid-like activity
- Collagen booster activity
- Broad spectrum antiaging properties
- Skin reinforcement & replenishment



# Skin integrity improvement

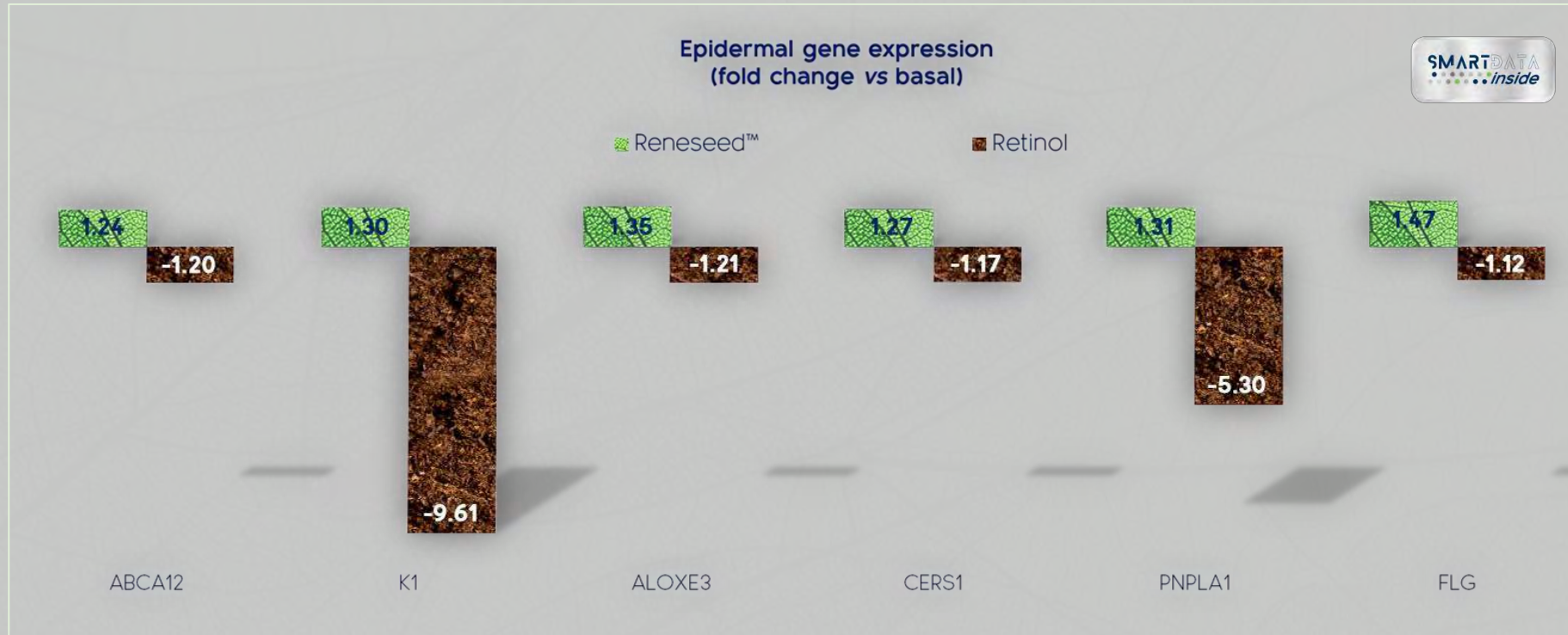


- Human Epidermal keratinocytes, adult (HEKa)
- 24 h with 20 ng/mL Reneseed™ active ingredient corresponds to 2% of Reneseed™
- 20 ng/mL Retinoic acid
- RT-qPCR (quantitative PCR):
  - ABCA12 (ATP binding cassette subfamily A member 12): keratinocyte transmembrane lipid transporter
  - K1 (Keratin 1): structural protein implicated in the keratinocytes differentiation
  - ALOXE3 (Arachidonate Lipoygenase 3): plays a role in the synthesis of corneocytes lipid envelope
  - PNPLA1 (Patatin like phospholipase domain containing 1): implicated in the synthesis of essential lipids for the stratum corneum
  - FLG (Filaggrin): contribute to generation of NMF by its degradation

➤ Upregulation of genes related with the production of epidermal lipids, improving the skin integrity & protection



# Skin integrity improvement



- Human Epidermal keratinocytes, adult (HEKa)
- 48 h with 20 ng/mL Reneseed™ active ingredient corresponds to 2% of Reneseed™
- 120 ng/mL Retinol
- RT-qPCR (quantitative PCR):
  - ABCA12 (ATP binding cassette subfamily A member 12): keratinocyte transmembrane lipid transporter
  - K1 (Keratin 1): structural protein implicated in the keratinocytes differentiation
  - ALOXE3 (Arachidonate Lipoxygenase 3): plays a role in the synthesis of corneocytes lipid envelope
  - CERS1 (Ceramide Synthase 1): implied in the synthesis of ceramides
  - PNPLA1 (Patatin like phospholipase domain containing 1): implicated in the synthesis of essential lipids for the stratum corneum
  - FLG (Filaggrin): contribute to generation of NMF by its degradation

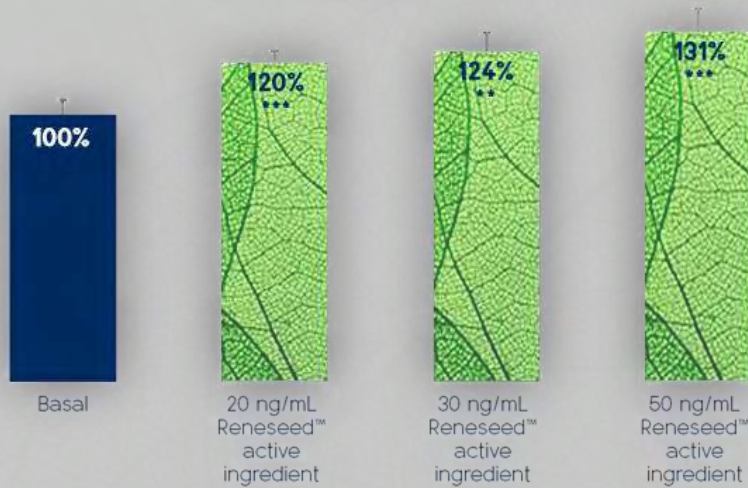
➤ Upregulation of genes related with the production of epidermal lipids, improving the skin integrity & protection





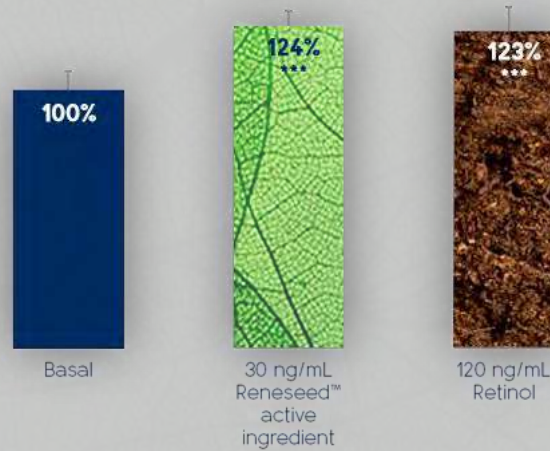
# Collagen I synthesis, Reneseed™ & Retinol

Collagen booster, collagen I (%)



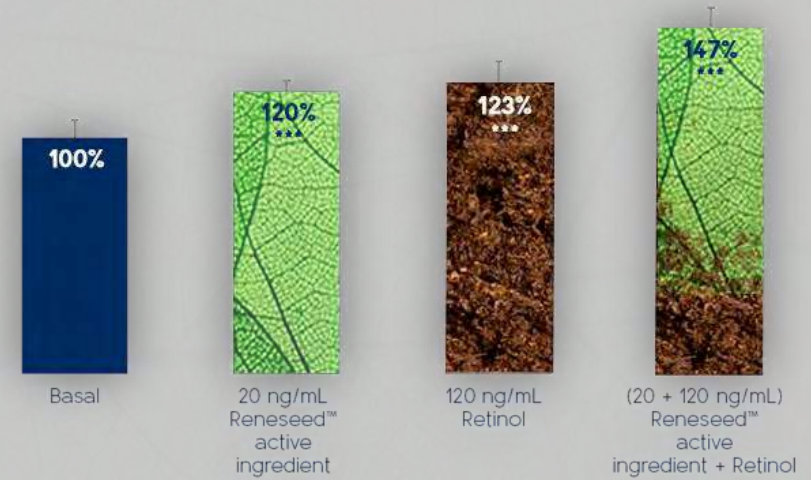
\*\*\*p<0.001 vs T0  
\*\*p<0.01 vs T0

Retinol-like, collagen I (%)



\*\*\*p<0.001 vs T0

Synergistic effect, collagen I (%)



\*\*\*p<0.001 vs T0

Reneseed™ is four times more potent than retinol



Proven synergistic effect of Reneseed™ with retinol

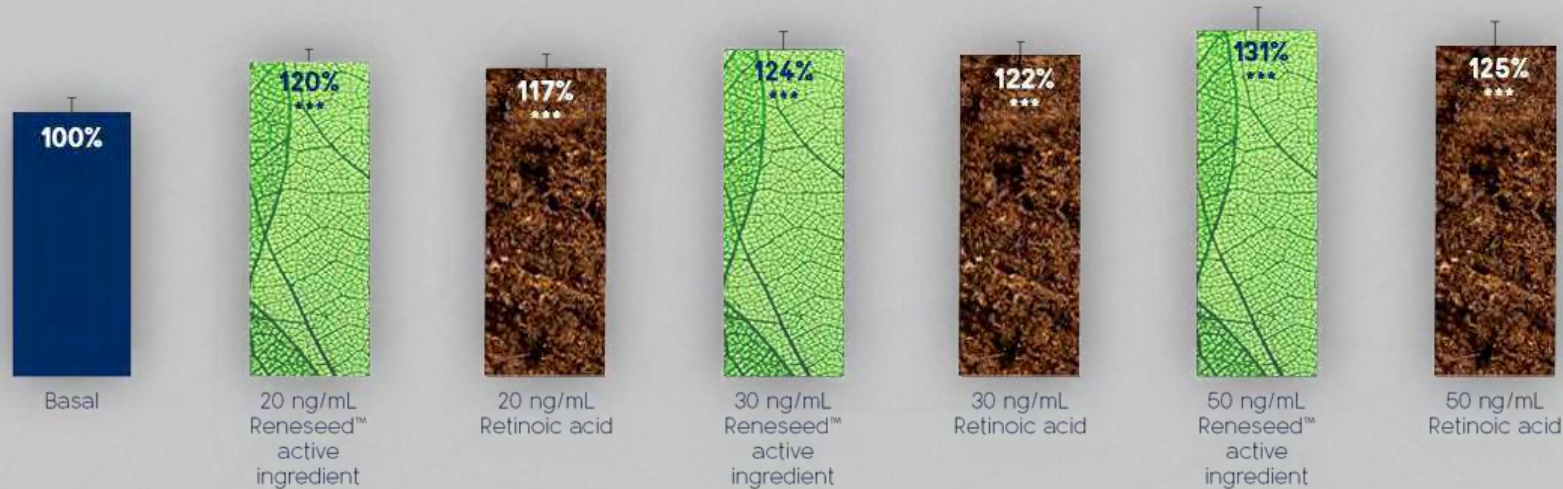


- Human Dermal Fibroblasts, adult (HDFa)
- 48 h
- 20 ng/mL, 30 ng/mL and 50ng/mL Reneseed™ active ingredient corresponds to 2%, 3% and 5% of Reneseed™
- 120ng/mL Retinol
- ELISA



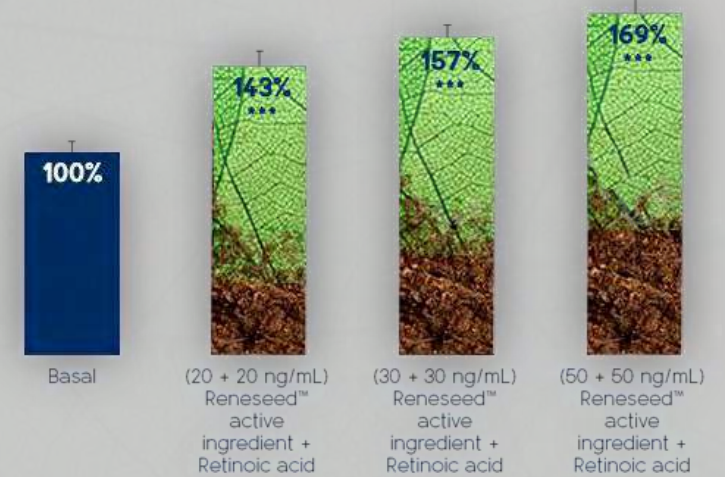
# Collagen I synthesis, Reneseed™ & Retinoic Acid

Retinoic acid-like, collagen I (%)



\*\*\*p<0.001 vs T0

Synergistic effect, collagen I (%)



\*\*\*p<0.001 vs T0

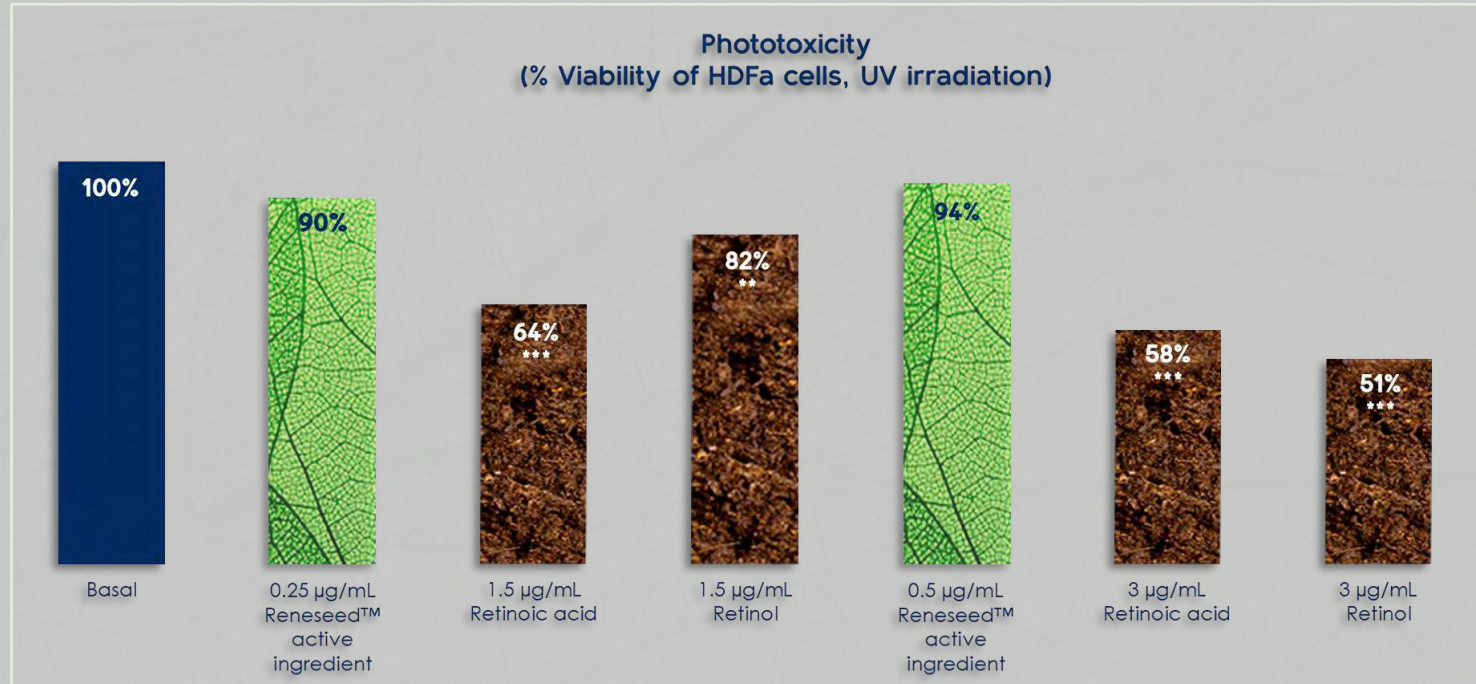
➤ Proven synergistic effect of Reneseed™ with retinoic acid



- Human Dermal Fibroblasts, adult (HDFa)
- 48 h
- 20 ng/mL, 30 ng/mL and 50ng/mL Reneseed™ active ingredient corresponds to 2%, 3% and 5% of Reneseed™
- 20ng/mL, 30 ng/mL and 50 ng/mL of Retinoic acid
- ELISA



# Phototoxicity, Reneseed™ & Retinoids



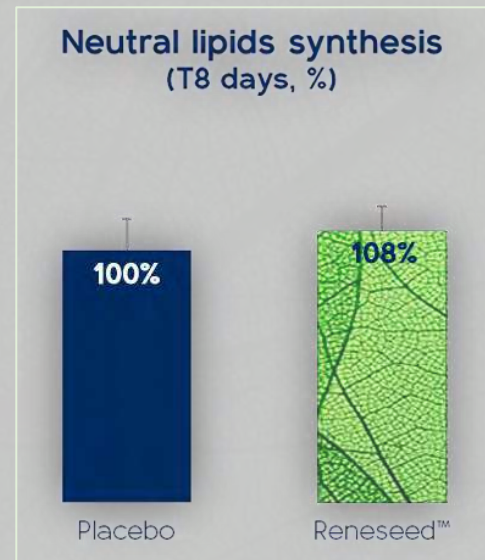
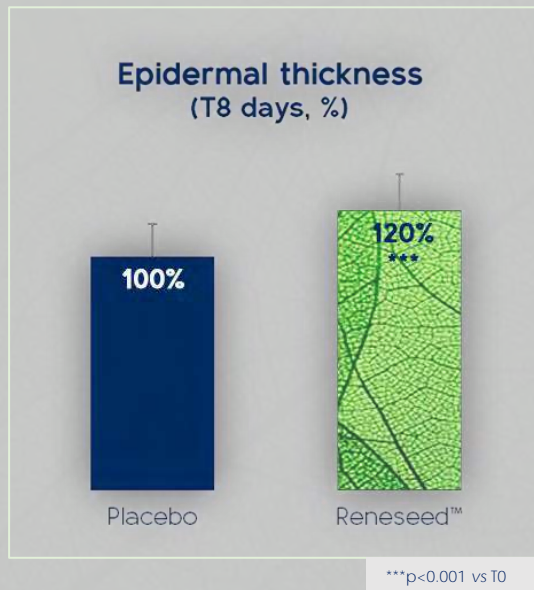
\*\*\*p<0.001 vs T0  
\*p<0.05 vs T0

➤ Reneseed™ did not show phototoxicity when compared with retinoic acid & retinol

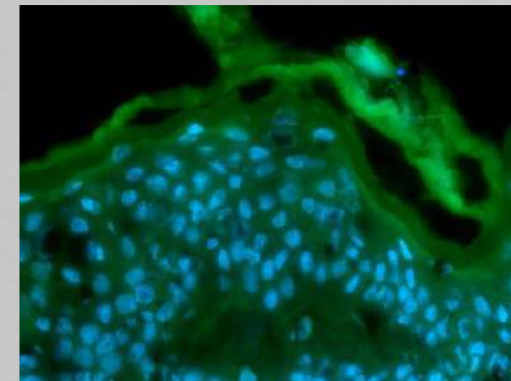
- Human Dermal Fibroblasts, adult (HDFa)
- Cells irradiated with UVA (Light dose: 3.7J/cm<sup>2</sup>)
- 0.25 µg/mL and 0.5 µg/mL Reneseed™ active ingredient corresponds to 25% and 50% of Reneseed™
- 1.5 µg/mL, 3µg/mL and 6µg/mL of Retinoic acid & Retinol
- MTT



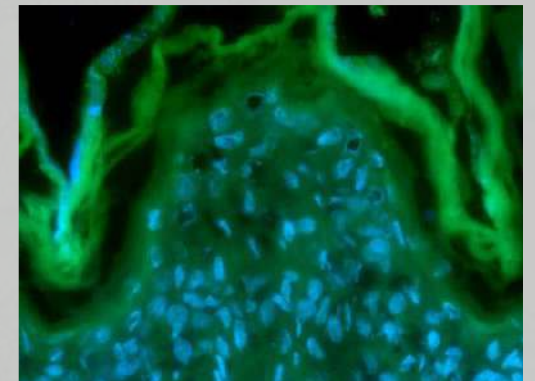
# Epidermal thickness & Lipids



Placebo, T8 days



1.5% Reneseed™ (neutral lipids in green, T8 days)



➤ Epidermal thickness reinforcement

➤ Epidermal lipid filler efficacy

- Human skin explant (52 years old)
- 8 days
- Cream with 1.5% Reneseed™
- Masson's trichrome staining method + microscopy (epidermal thickness)
- LipidTOX™ staining method + microscopy (neutral lipids)

# Wrinkle smoothing



\*\*p<0.01 vs T0  
\*\*p<0.01 vs placebo



\*\*p<0.01 vs T0  
\*p<0.05 vs T0  
\*\*p<0.01 vs placebo  
\*p<0.05 vs placebo



\*\*\*p<0.001 vs T0  
\*\*p<0.01 vs T0  
\*\*\*p<0.001 vs placebo  
\*p<0.05 vs placebo

- 20 female volunteers
- Age: 45-65
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face
- PRIMOS 3D

➤ Responders (85%) in 28 days, -19.4% wrinkle depth

➤ In 28 days up to:

- 42% in wrinkle count
- 31% in wrinkle volume
- 37% in wrinkle depth

# Wrinkle smoothing, Hormonal ageing



Hormonal ageing



\*p<0.05 vs T0  
#p<0.1 vs T0  
\*p<0.05 vs placebo

No hormonal ageing



\*p<0.05 vs T0  
#p<0.1 vs placebo

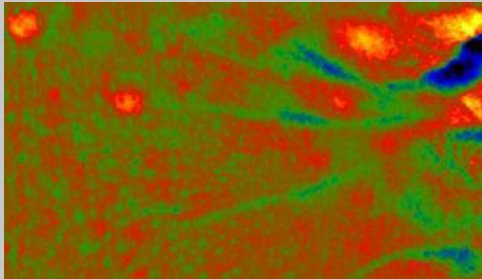
- 9 female volunteers after menopause (hormonal ageing)
- Age: 47-59
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face
- PRIMOS 3D

- 11 female volunteers before menopause (no hormonal ageing)
- Age: 45-51
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face
- PRIMOS 3D

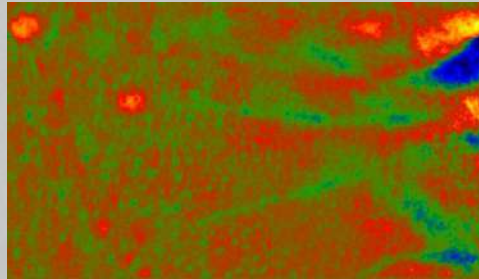


# Wrinkle smoothing

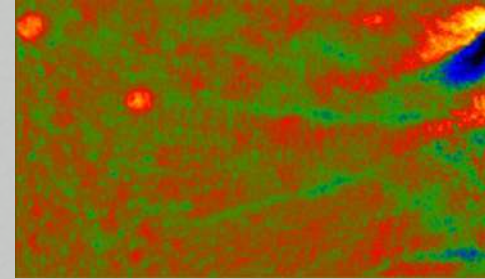
T0 days



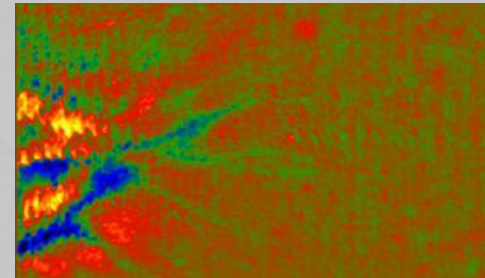
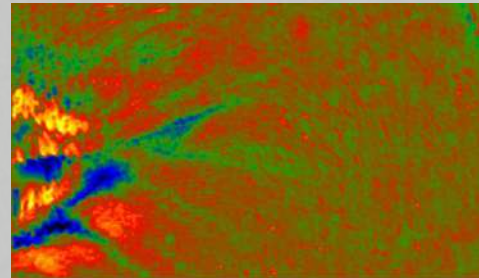
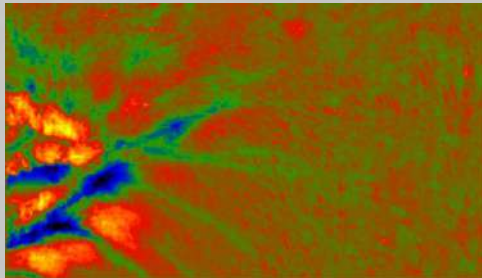
T7 days



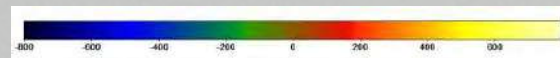
T28 days



- Vol 6
- 47 years old



- Vol 15
- 48 years old

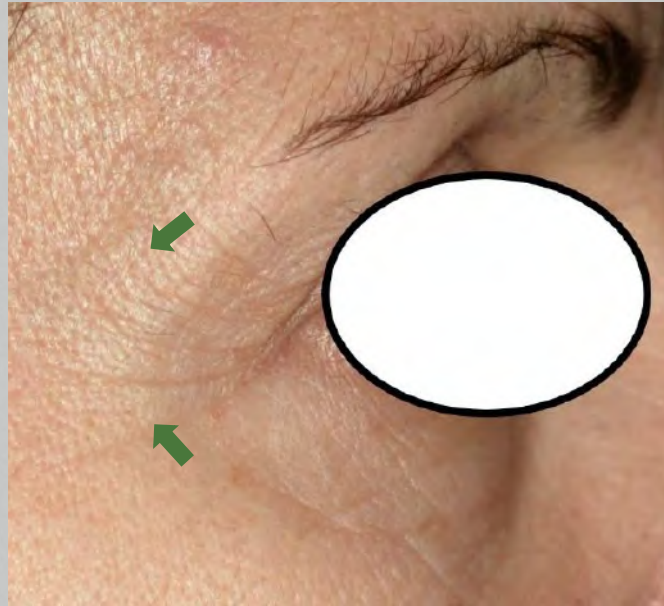


- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face
- PRIMOS 3D

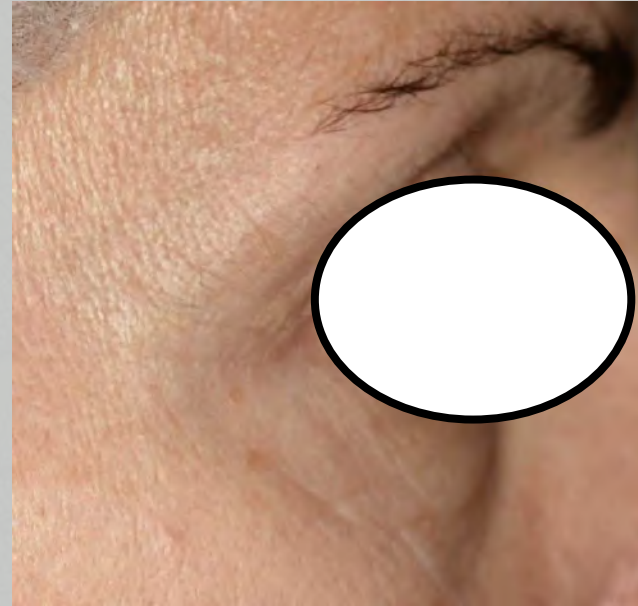
# Wrinkle smoothing



T0 days



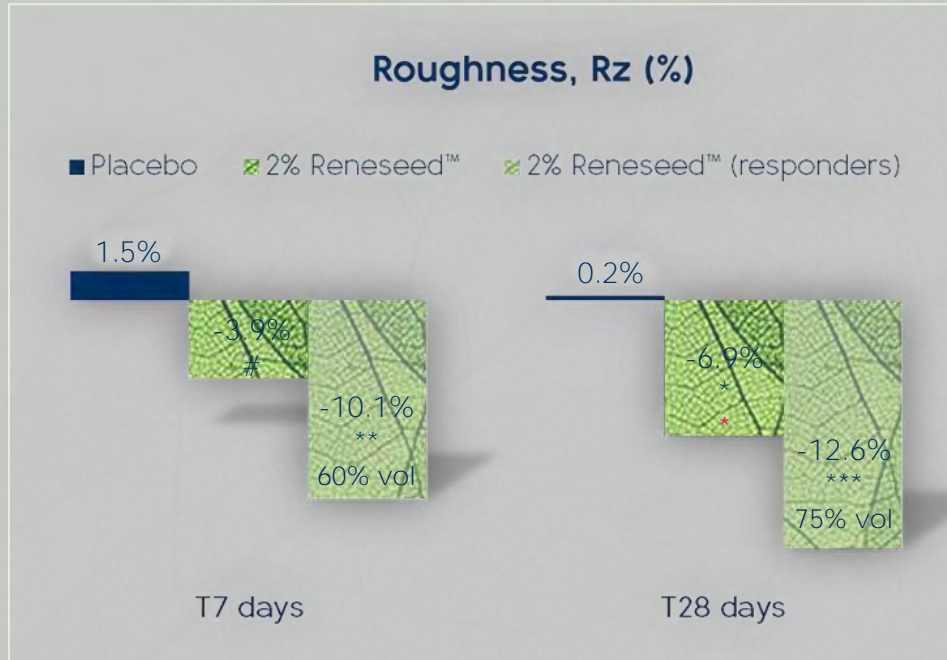
T28 days



- Vol 12
- 51 years old
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face face

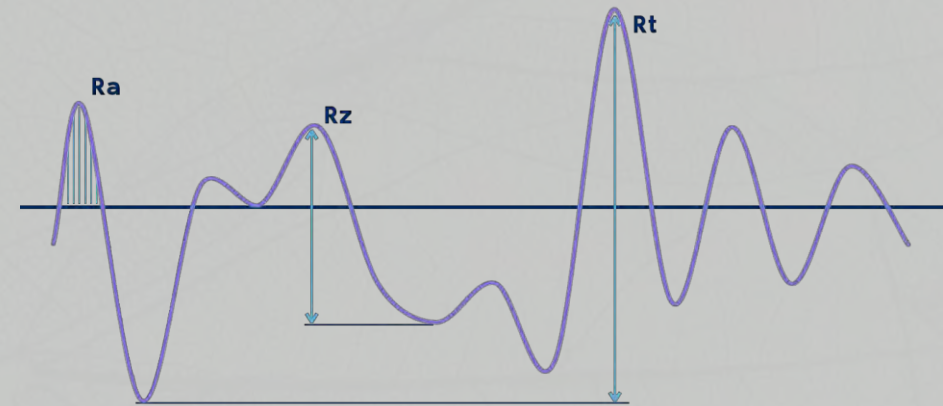


# Wrinkle smoothing



\*\*\*p<0.001 vs T0  
\*\*p<0.01 vs T0  
\*p<0.05 vs T0  
#p<0.1 vs T0  
\*p<0.05 vs placebo

Rz is the average of the maximum height of the profile



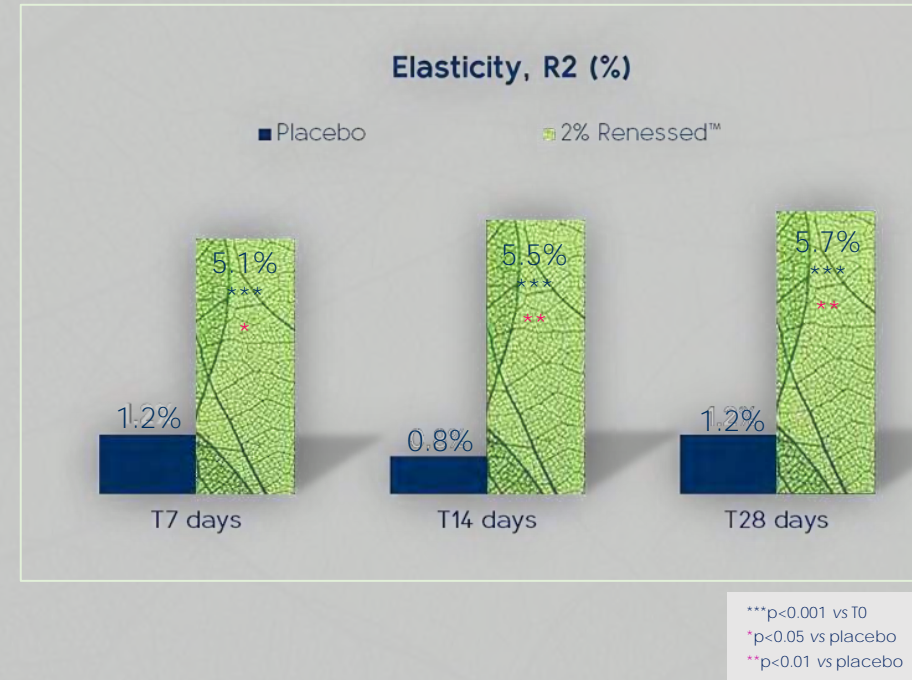
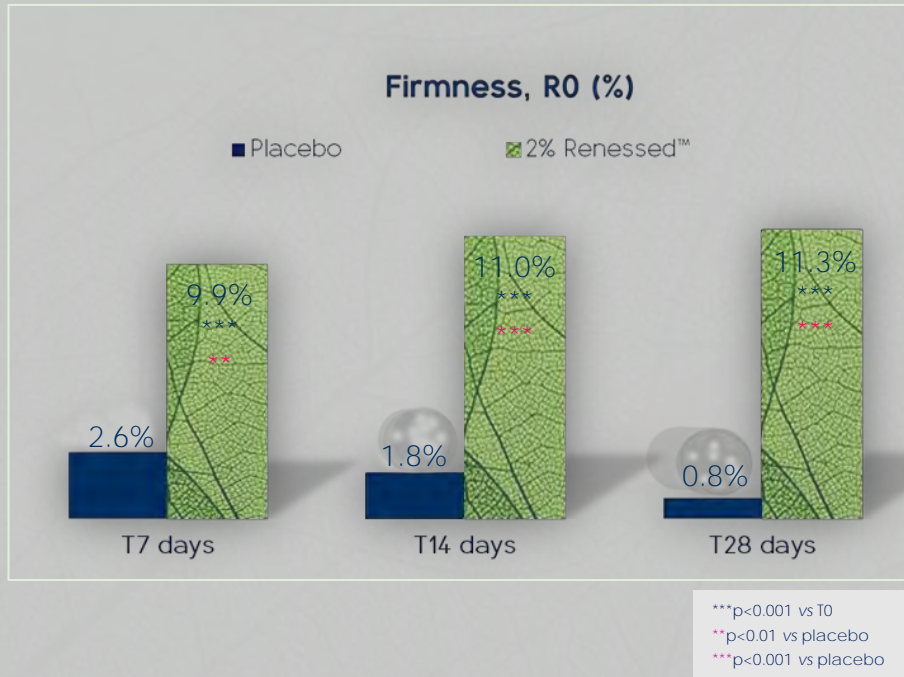
Up to:

- 21% in 7 days
- 26% in 28 days

- 20 female volunteers
- Age: 45-65
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face
- PRIMOS 3D



# Firmness and elasticity



👁 Responders (95%) in 28 days:  
 +12.6% firmness  
 +6.1% elasticity

👁 In 28 days, up to:  
 +22% firmness  
 +17% elasticity

- 20 female volunteers
- Age: 45-65
- Cream with 2% Rensesed™
- Twice a day for 28 days, half-face face
- Cutometer®



## Firmness and elasticity

T0 days



T28 days



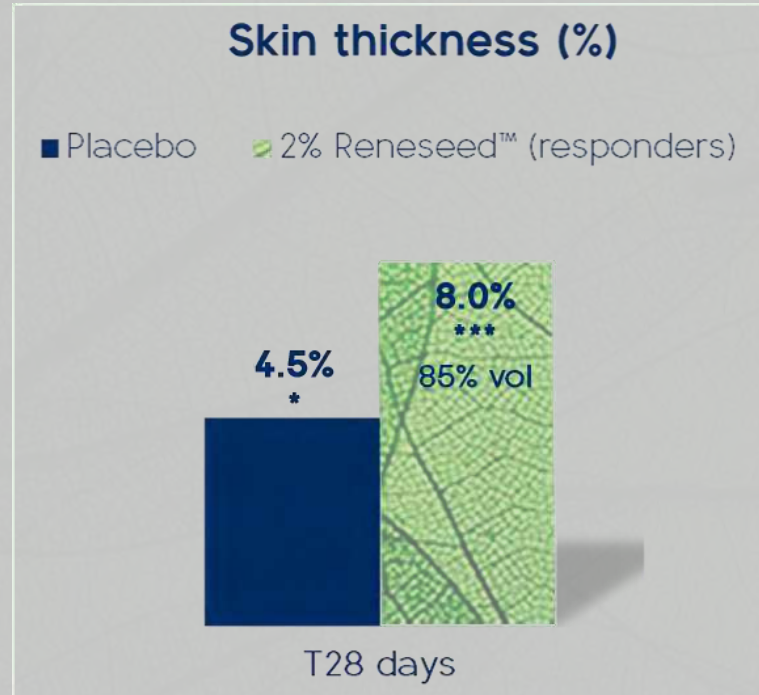
Reneseed™ improves the neck definition, caused by the loss of elasticity and firmness



- Vol 12
- 51 years old
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face face



# Skin thickness



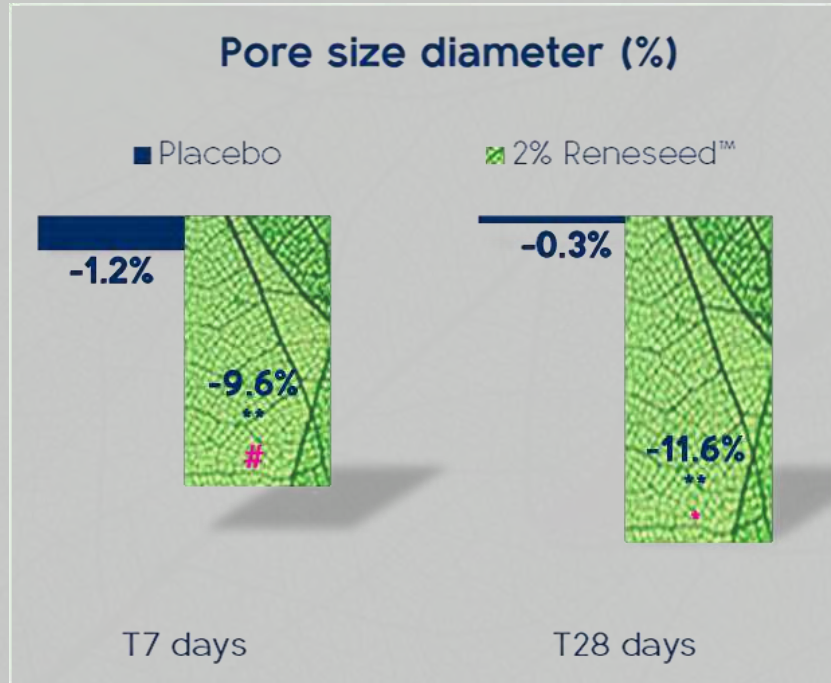
\*p<0.05 vs T0  
\*\*\*p<0.001 vs T0

👁 In 28 days, up to +16% skin thickness

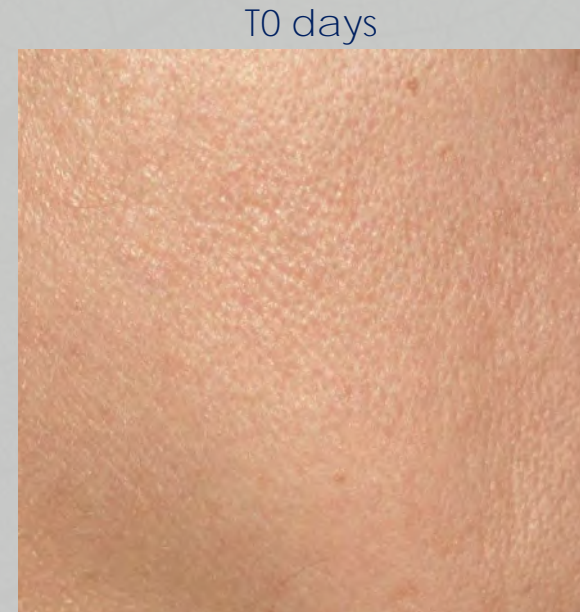
- 20 female volunteers
- Age: 45-65
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face
- Hitachi ultrasound



# Pore size minimizer



\*\*p<0.01 vs T0  
\*p<0.05 vs placebo  
#p<0.1 vs placebo



T0 days



T28 days

• Vol 12  
• 51 years old

👁 Responders (80%) in 28 days, -16.2% pore size diameter



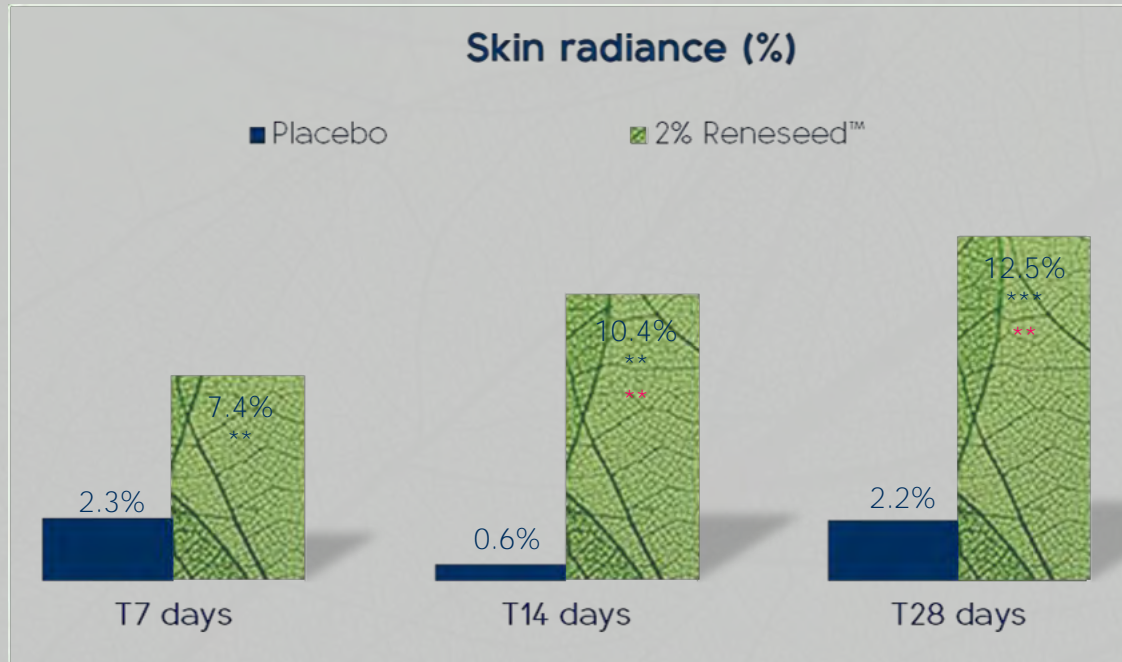
👁 Up to:  
-27% in 7 days  
-44% in 28 days



- 20 female volunteers
- Age: 45-65
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face
- PRIMOS 3D



# Skin radiance



\*\*\*p<0.001 vs T0  
\*\*p<0.01 vs T0  
\*\*p<0.01 vs placebo



● Vol 9  
● 50 years old

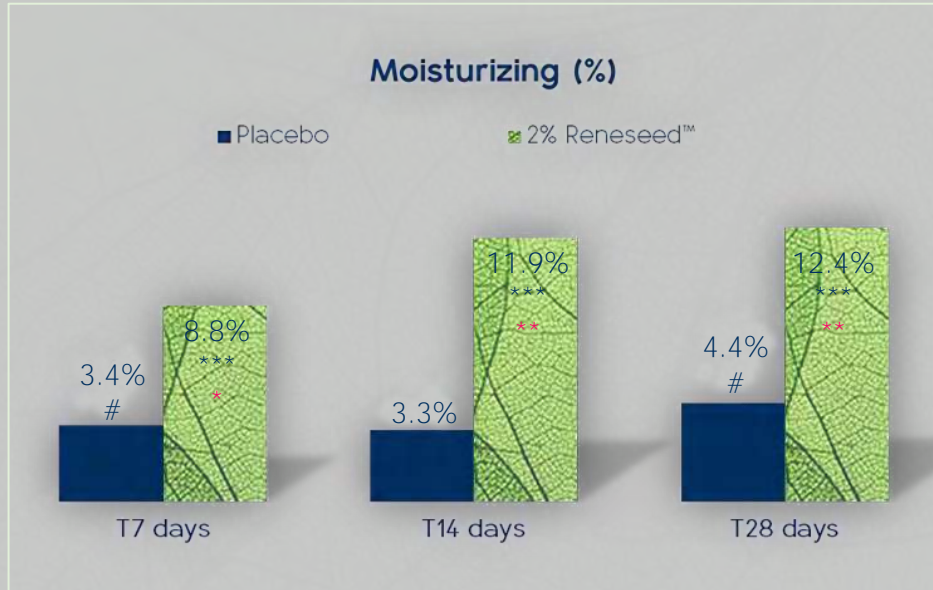
👁 Responders (90%) in 28 days, 14.4% skin radiance

👁 Up to:  
+33% in 7 days  
+42% in 28 days

- 20 female volunteers
- Age: 45-65
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face
- Spectrophotometer/colorimeter CM-700D



# Skin moisturizing



\*\*\*p<0.001 vs T0  
#p<0.1 vs T0  
\*\*p<0.01 vs placebo  
\*p<0.05 vs placebo



\*\*\*p<0.001 vs T0  
\*\*p<0.01 vs T0  
\*p<0.05 vs T0  
\*p<0.05 vs placebo

- Moisturizing: 100% responders in 28 days
- TEWL: 90% of responders -11.2% in 28 days



- In 7 days, up to +27% hydration and -13% TEWL
- In 28 days, up to +28% hydration and -22% TEWL



- 20 female volunteers
- Age: 45-65
- Cream with 2% Reneseed™
- Twice a day for 28 days, half-face
- Corneometer® to evaluate moisturization
- TEWAMETER® to evaluate TEWL

## The seed of youth

Wake up your dormant beauty  
& rejuvenate your skin



Moisturizing &  
radiance  
properties

Broad spectrum  
antiaging  
properties

Epidermal  
lipid filler

Retinol & Retinoic acid-like &  
collagen booster efficacy (for  
day & night treatments)

Pore size  
minimizer

## Technical information

- Product Name: Reneseed™
- Planted-based biotechnological ingredient
- Recommended dose: 1.5-2%
- INCI name of the active ingredient: Nicotiana Benthamiana  
Hexapeptide-40 sh-Polypeptide-76
- 99.9% Natural origin (ISO standard 16128)
- Appearance: Solution
- Solubility: Water soluble



IH-822/2.1/B94





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