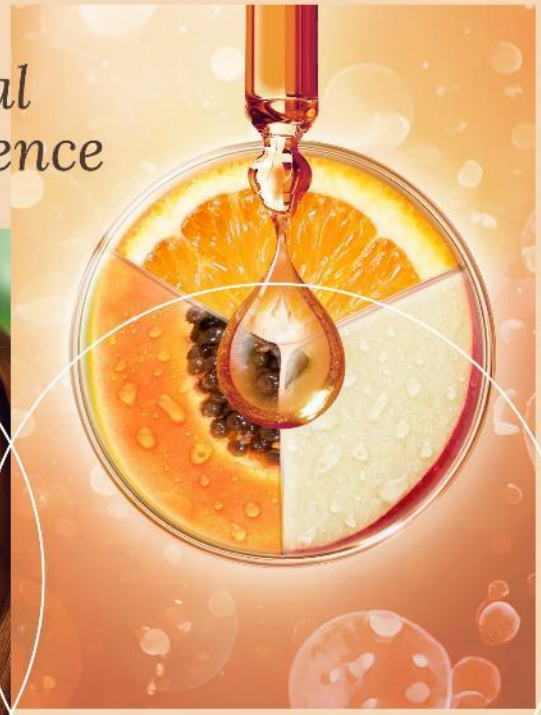
# EXOVIVE™

Powered by plant-derived exosome technology

*Elevating natural skincare science*







**Naturals** | The science of nature

Oct 2026

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# Agenda


From in-clinic to daily routine: the exosomes revolution

Introducing EXOVIVE™ LIFT

EXOVIVE™ LIFT substantiation

EXOVIVE™ LIFT line-up




# Exosomes are sparking a *revolution*

*From in-clinic to daily routine, this breakthrough technology is rewriting the future of skincare.*

Inspired by regenerative medicine, exosomes are now making waves in high-efficacy premium skincare, focusing on skin health and recovery.

Google searches for "Exosome" have surged 206% worldwide in the past year and skincare launches with exosome claims are rapidly growing in early adopter regions such as Korea and North America.

Source: WGSN & Mintel



# The Exosomes opportunity

## Key ingredient 2025




Wardah Beauty dropped its first exosome-powered serum. It claims **delivering skin regenerative benefits deeper into the skin**.



Tapping into exosomes, Augustinus Bader has launched The Elixir, **an ultra-concentrated skin renewal serum powered by a biomimetic delivery system** and peptides to "**enhance intercellular communication**", helping to visibly improve fine lines and wrinkles.




K-beauty inspired brand Modern Molecules has launched a new **exosome-based serum** that **strengthens the skin's repair abilities. Said to delay the skin's ageing process by 5.5 years within two months**.



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# The Exosomes opportunity

## Key ingredient 2025




INKEY List's Exosome Hydro-Glow Complex resurfaces, rejuvenates and hydrates the skin with **technology previously exclusive to professional cosmetic clinics. Its formula is packed with 3 mln plant-derived exosomes to boost collagen.**




Dr. Barbara Sturm's Exoso-Metic Face Serum, with unique blend of exosome and growth factor technologies, **harnesses the power of natural cell communication**, for effective anti-aging and **skin regeneration.**



Korean brand Medicube's new PDRN Pink Collagen Exosome Shot Ampoule is an aesthetic-grade ampoule with exosomes-coated spicules.

# When cells stop talking, skin starts aging

*Skin is a living network of cells constantly communicating, through microscopic messengers called exosomes.*

Exosomes are extracellular vesicles used as couriers to exchange essential nutrients such as peptides, lipids, antioxidants and growth factors, amongst others. They also deliver genetic instructions that enable key regeneration processes (e.g. miRNA).

They **nurture, re-programme, restore**.

As we age, fewer messages get through.
Cellular conversations quiet, and skin loses its vitality, leading to premature aging. It is one of the known hallmarks of aging ("intercellular communication").

**Aging, at its core, is a communication breakdown.**





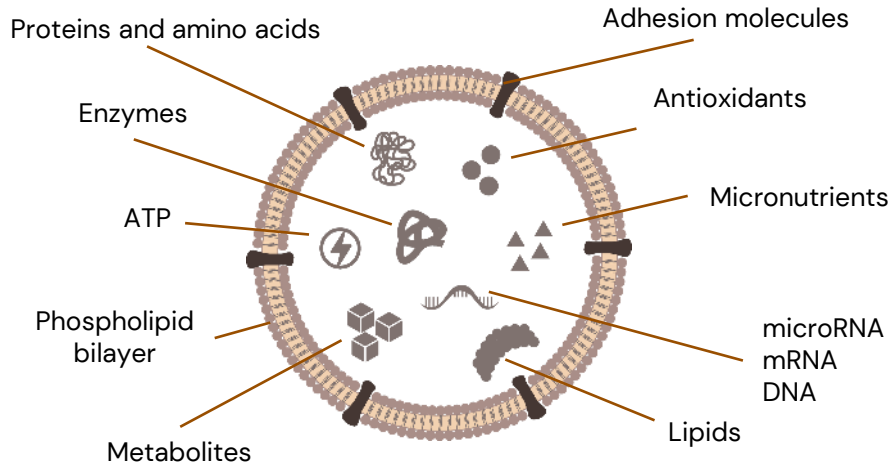
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# The extracellular vesicles
## A recent pharmaceutical discovery

- Extracellular vesicles have been discovered for the first time in 1980s in red blood cell and have been named Exosomes in 1990s, but their role wasn't clear at that time and first suspected to be used as a cellular trash can.
- They are present in almost all animal and vegetal cells.
- The vesicle is surrounded by a lipidic bilayer membrane. This membrane includes also adhesion molecules and receptor proteins to recognize the target cells.
- Exosomes are the tiniest vesicles, reserved to human being. Extracellular vesicles have a size within a range from 30nm to 1000nm.




**Typical micro-vesicle**






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# What if nature could resume the conversation?

*Intercellular communication within plants happens in the same way.*

Plant extracellular vesicles serve as carriers and provide unique natural protection for secondary metabolites (bioactives) against oxidation and enzymatic damage. They are nature's quintessence, the most potent part of the plant, which promotes resilience, growth and renewal at a cellular level.

With a similar structural lipidic bilayer membrane as a cell membrane, plant-derived exosomes can easily penetrate and enter target skin cells for enhanced biological activity and superior efficacy.

**Plant-derived exosomes don't just penetrate skin, they integrate, like a piece of the same puzzle.**

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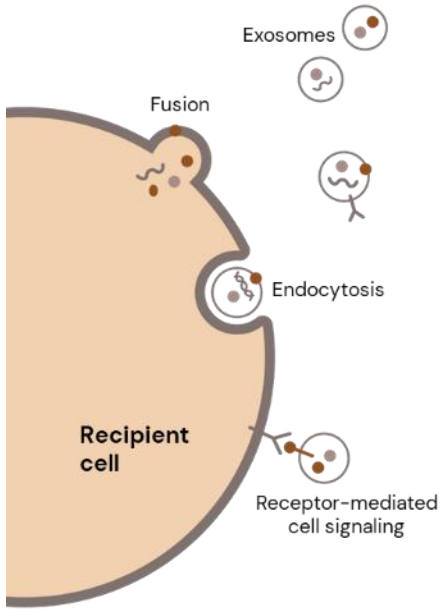
# Plant-derived Exosomes

## High bio-compatibility for strong efficacy

Plant-derived Exosomes enter the recipient cell by 3 mechanisms:
Fusion – Endocytosis - Receptor cell signaling

Once inside the skin cell, they migrate to the nucleus. They are highly effective at delivering bioactive molecules, offering advantages in targeting, stability, and biocompatibility.

Their size: between 100 and 300nm.




Extracellular space

Visualization of Plant-derived Exosomes
Image is captured with confocal microscope
in yellow: Plant-derived Exosomes
in blue: nucleus of fibroblast



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# At dsm-firmenich we're decoding nature's intelligence

Introducing **EXOVIVE™**
**Welcome to the future of natural skincare science!**



# Our partner: EXOLAB
## 20 years of experience and patented technology

- **A pioneer in the world of plant-derived extracellular vesicles**.
- Founded through the shared vision of pioneers **Valerio Carconi** & **Lorenzo Cilli**, both seasoned veterans of multinational corporations and successful entrepreneurs, along with esteemed researchers **Mariantonia Logozzi** & **Stefano Fais**.
- **Dr. Mariantonia Logozzi**, CTO, is the pivotal researcher (former Researcher at the Italian NIH, ISS, 76 publications on PubMed), co-founder and owner with **prof. Stefano Fais** (CSO) (former Head of Research at the Italian NIH, ISS, up to 240 publications on PubMed), **Valerio Carconi** (marketing coordinator) and **Lorenzo Cilli** (CFO).
- **Superiority of plant-derived exosomes from organic farming vs conventional farming:**
  - **More (up to +49%) microvesicles derived from organic agriculture** compared to conventional fruits.
  - **Smaller vesicles derived from organic agriculture** compared to vesicles from conventional fruits
  - **Higher antioxidant capacities in the organic agriculture-derived microvesicles** than in conventional nanovesicles
  - **High stability** regarding chemical lysis/pH and physical lysis/ultrasonic bath



**Prof. Stefano Fais**
CSO



**Dr. Mariantonia Logozzi**
CTO and Head of innovation



**Valerio Ferri**
CEO



**Lorenzo Cilli**
CFO



**Valerio Carconi**
Head of Sales & Marketing


**Scientific publications:**

✓ Logozzi M. et al. , Nanovesicles from organic agriculture-derived fruits and vegetables: characterization and functional antioxidant content, Int. j. Mol. Sci,, 2021, 22, 8170

✓ Logozzi M. et al., The potentiality of plant-derived nanovesicles in human health – a comparison with human exosomes and artificial nanoparticles, , Int. j. Mol. Sci,, 2022, 23, 4919

✓ Logozzi M. et al., Antioxidant effect of a plant-derived extracellular vesicles' mix on human skin fibroblasts: induction of a reparative process, Antioxidants, 2024, 13, 1373, Seminars in cancer biology, 2022, 86, 13-125

**IP on technology and plant blends:**

✓ WO2022157726A1 Nanovesicules deriving from biological plants as natural carriers of phyto-complexes for nutraceutical, cosmetic and regenerative use

✓ WO2022201066A1 Method of applying electrical impulses for the purpose of loading various molecules into plant-derived nanovesicles

# Gentle, solvent-free extraction process preserving exosome integrity

Exosomes are isolated through a multi-step physical process using centrifugation and filtration, removing cellular debris (e.g. fibers, cells, mitochondria) and larger vesicles (e.g. apoptotic bodies).

**Physical extraction** only (pressing, centrifugation, filtration)

- **No solvents** used
- **Mild conditions** to preserve exosome integrity
- **Low energy** process
- **Higher exosome yield** from organic fruits vs conventional sourcing




*: squeezing for fruit and cold-water infusion for plants



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# From fruit to root…

*…we harness the whole plant to deliver nature's intelligence.*

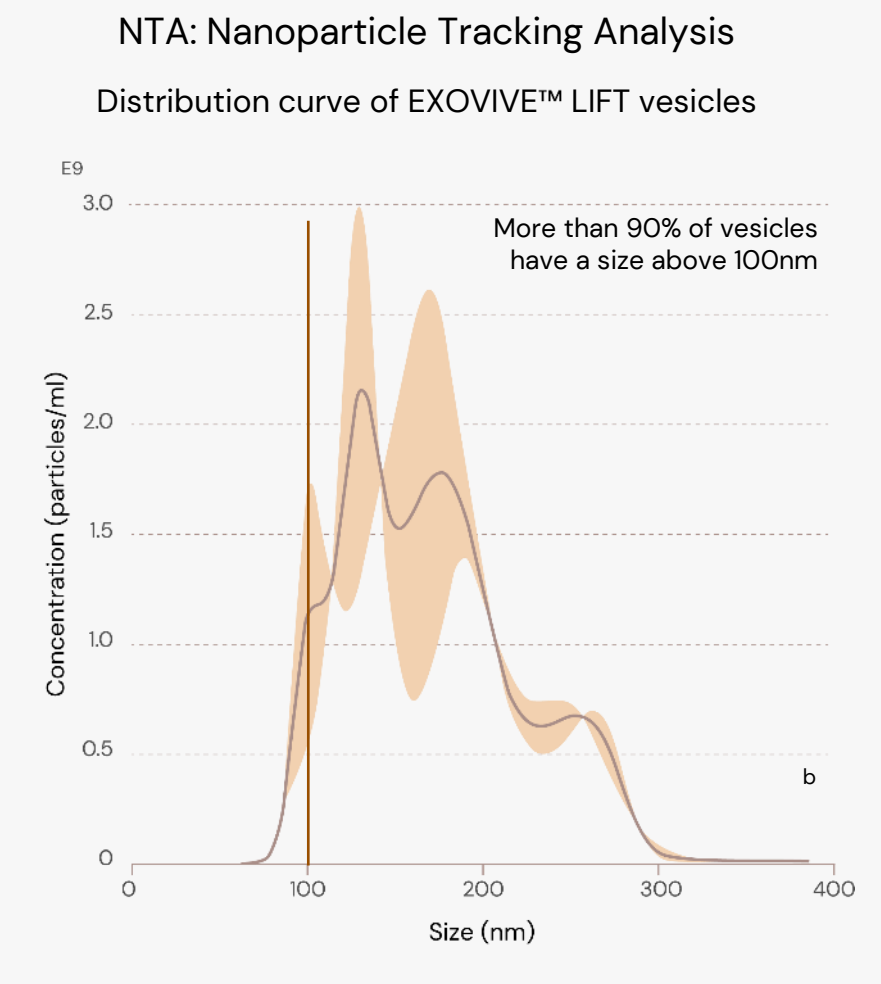


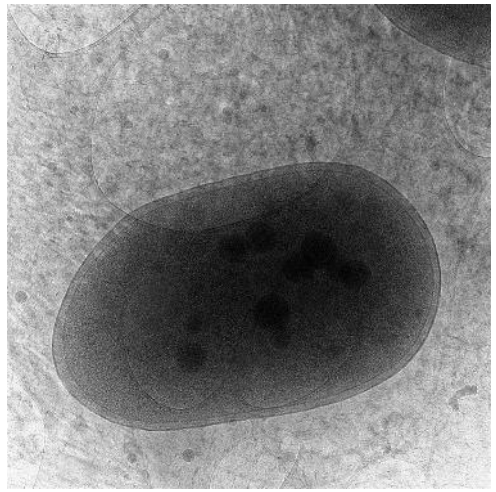



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# Extracellular vesicles with a size above 100nm

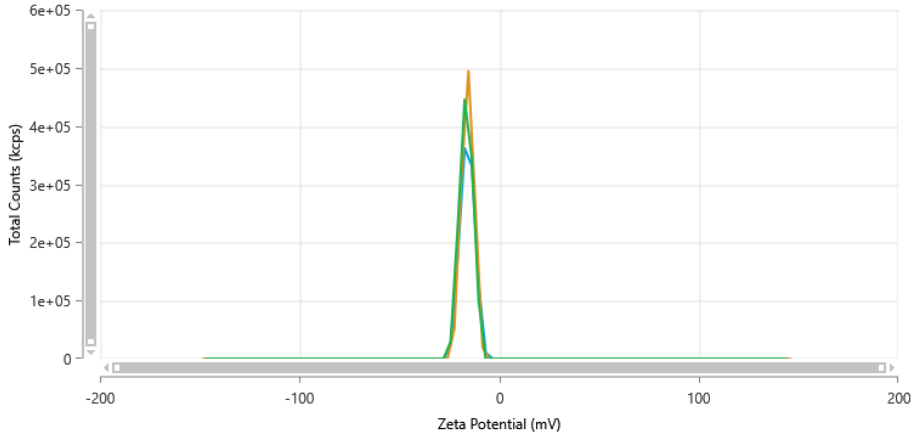
## Visualization of plant-derived exosomes by microscope and analysis of the size of the vesicles



Microscope: evaluation of nanovesicle integrity through TEM (Transmission Electron Microscopy) analysis) Plant-derived exosomes (black) in keratinocyte.

- Unique technology to isolate the plant vesicles, preserving intact the membrane of vesicle.
- Every lot is quantified in number of plant-derived exosomes to guarantee the efficacy
- Severe quality control: the size and shape of vesicles are controlled, and only valid vesicles are counted.
- The zeta potential of plant-derived exosomes is measured by Dynamic Light Scattering (DLS) to guarantee a high stability in liquid solution and high ability to penetrate biological membrane.

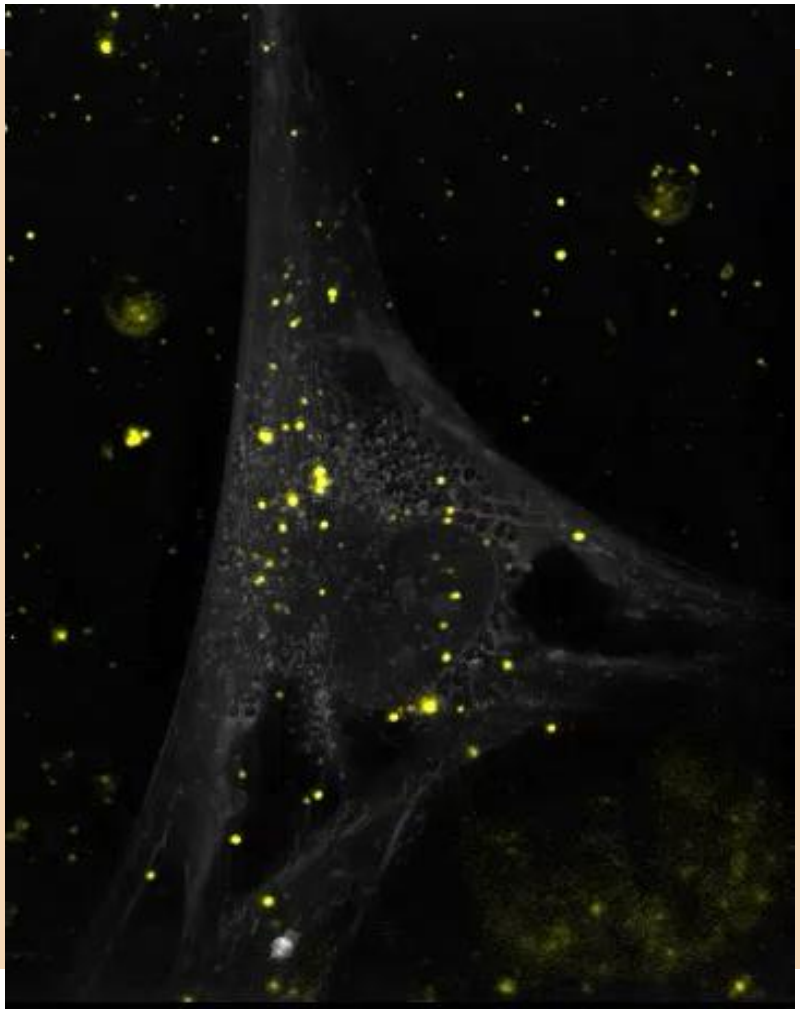




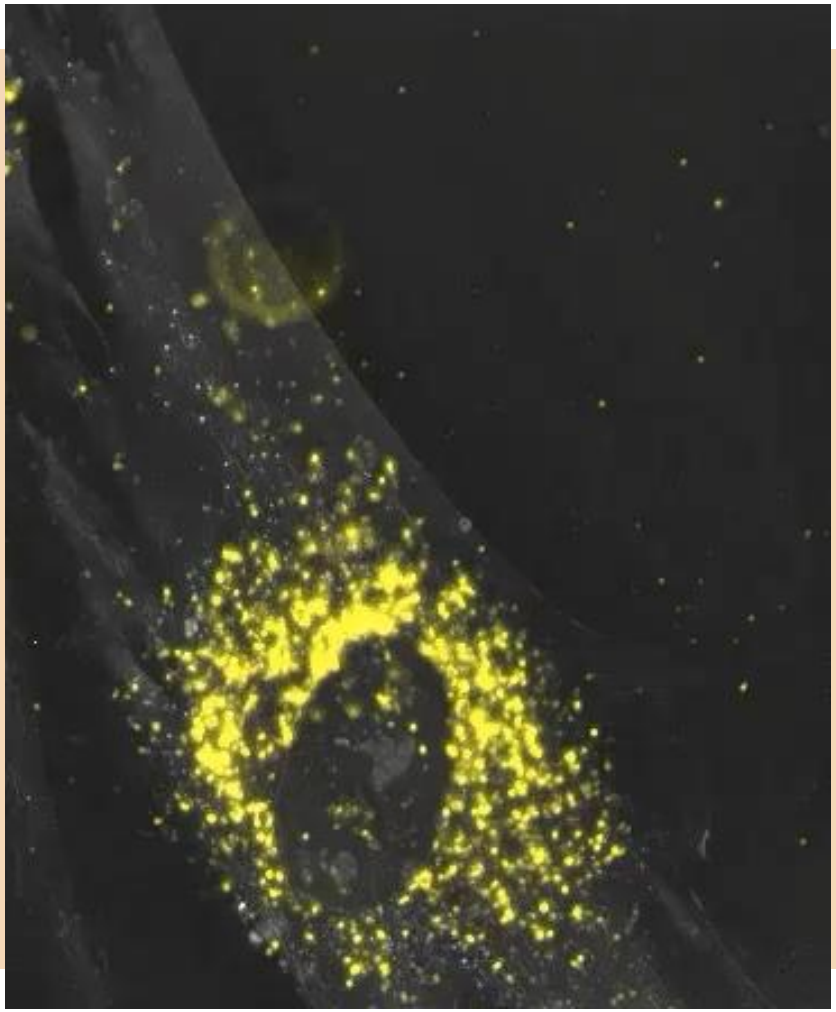

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# Plant-derived exosomes effectively deliver bioactives into cells

At 3 hours, plant-derived exosomes transported from the extracellular space into cells.



At 13 hours, plant-derived exosomes transported from the cell periphery and concentrated in the perinuclear region.

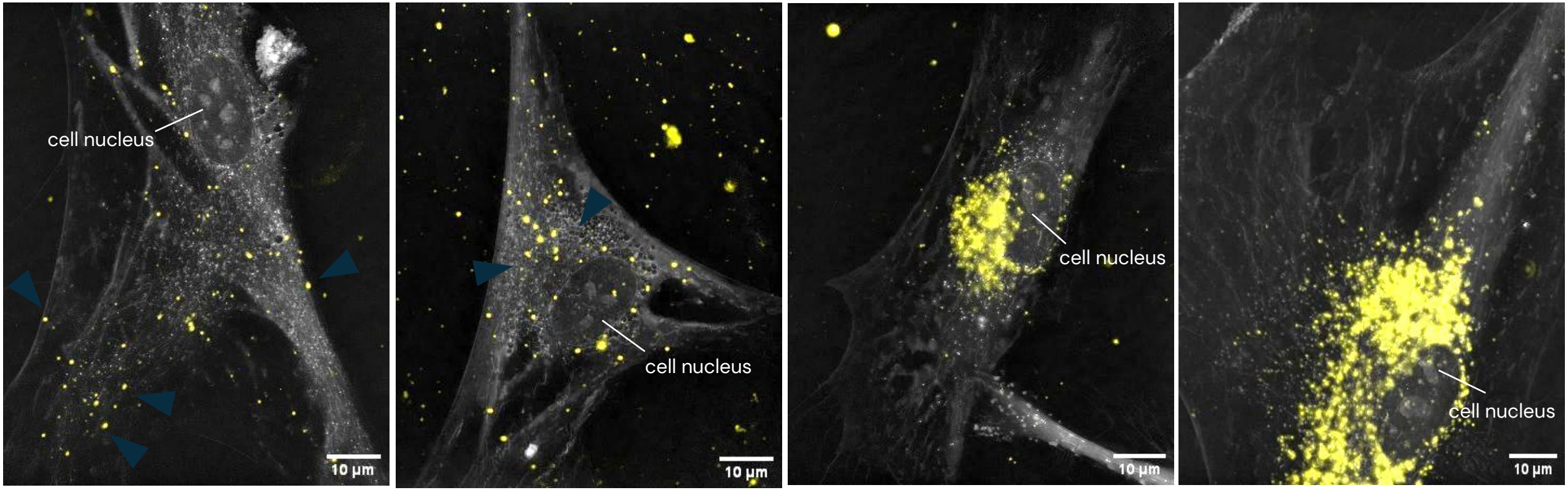


Holotomography microscope (Nanolive) visualization: plant derived exosome EXOVIVE™ LIFT (labeled in yellow) entering the fibroblast and migrating to the nucleus



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# The uptake of plant-derived exosomes




0.5 h

Exosomes began to localize in the peripheral region of the cells

3 h

Exosomes already transported to the perinuclear region

5 h

Majority of exosomes had accumulated near the nucleus

24 h

Accumulation within the cells had further increased

Holotomography microscope (Nanolive) visualization: EXOVIVE™ LIFT (labeled in yellow) entering the fibroblast and migrating to the nucleus.



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# EXOVIVE™ LIFT

Powered by plant-derived exosome technology

*Nature's cellular code for skin regeneration.*





NEXT-GEN exosomes

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**Naturals** | The science of nature

# EXOVIVE™ LIFT
## ID Card: 5018504

**INCI NAME:** Malus Domestica Fruit Extract, Citrus Reticula (Tangerine) Fruit Extract, Carica Papaya (Papaya) Fruit Extract, Maltodextrin

**SUSTAINABILITY:** Organic cultivation, responsible sourcing, with low impact on the environment

**TECHNOLOGY:**

- Gentle isolation of plant-derived exosomes from fruit juice with physical processes only
- 3.8 trillions plant-derived vesicles per g
- 100% of natural origin – no preservative

**TECHNICAL:**

| | | |
|---|---|---|
| Form: Powder | Use level: 0.026% (*in vivo*) | Solubility: Water |
| pH of use: 3.0- 10.0 | Preservative: Free | Biodegradable: Readily biodegradable |

**BENEFITS:**

- Re-densifies and plumps the skin for a more youthful and sculpted look**
- Reverses the wrinkle appearance by 8 years after 2 months, and by 4 years in just 1 month**
- +33% significant impressive boost of skin elasticity**
- +90% collagen 1 *
- Tackles 9 hallmarks by modulating key proteins involved in skin regeneration (via miRNAs*)**

**REGISTRATION CERTIFICATION:**











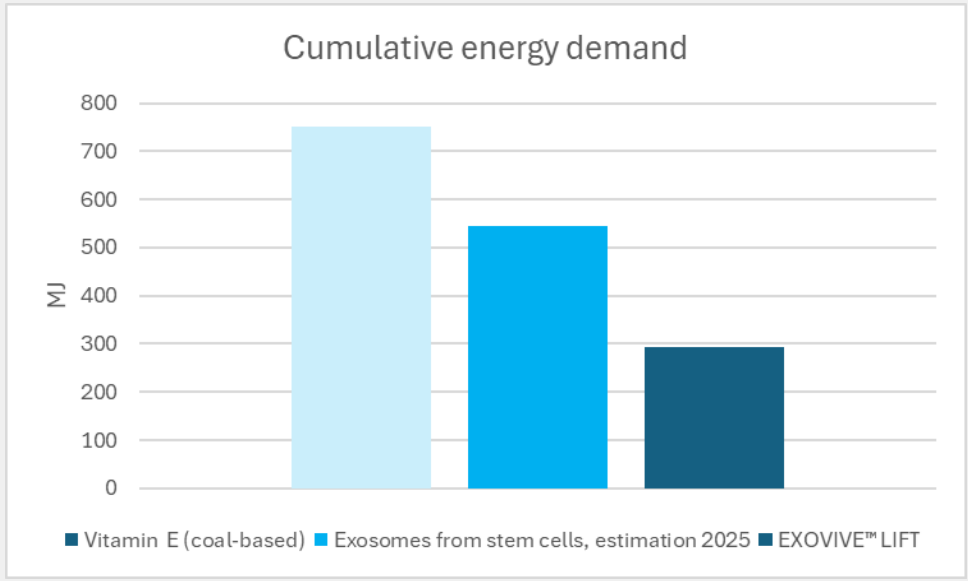

* In vitro ** In vivo after 2 months

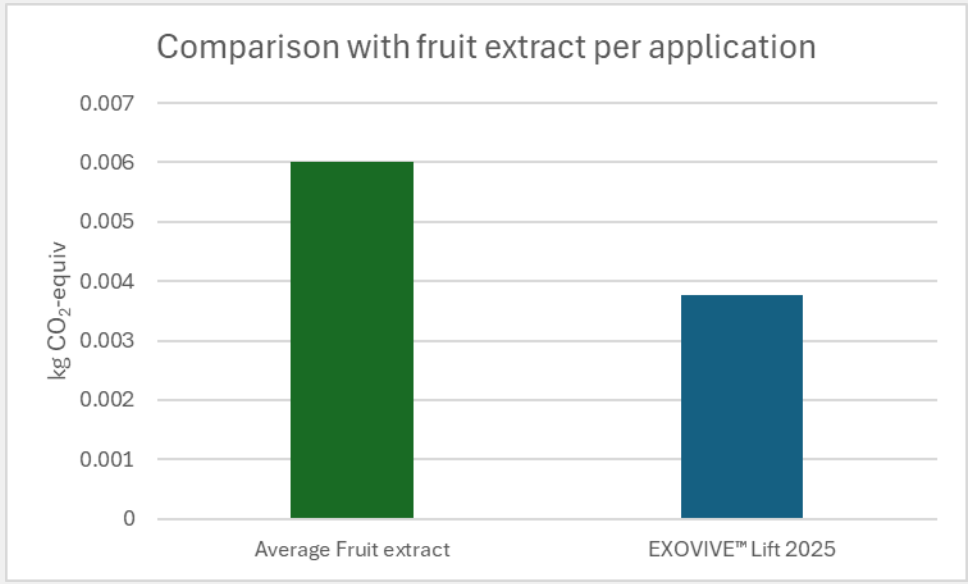


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# High performance. Minimal environmental impact

- **Fruit extraction uses mild physical processes, resulting in lower energy demand vs Vitamin E (coal based) and Exosomes from stemcell culture.**
  - It does not compete with food production and requires limited land. (1) Supports responsible sourcing and biodiversity.
  - It generates biodegradable waste, repurposed as compost or animal feed.
- **EXOVIVE™ LIFT delivers ~40% lower carbon footprint vs typical botanical extracts in final product (2)**
  - Fruit extracts used at 3% in creams generate around 6 mg $CO_2$-eq per application, compared to 3.77 mg $CO_2$-eq for EXOVIVE™ LIFT (3)
  - A single hand wash with warm water generates up to 0.016 kg $CO_2$-eq, which is much higher than one EXOVIVE™ LIFT daily application (3.77 mg $CO_2$-eq).
- **EXOVIVE™ LIFT adds performance without increasing formula footprint**
  - A cream with 2.9% glycerin + 0.026% EXOVIVE™ LIFT has the **same carbon footprint** as a cream with 3% glycerin alone.




1) 7.5 $m^2$*year/kg, calculated using "Selected LCI methods", EcoInvent 2.0, version 1.07
2) Based on apple juice extract carbon footprint data.
3) Calculated for a typical cream containing 0.026% EXOVIVE™ LIFT



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# EXOVIVE™ LIFT: strong green chemistry profile*

## Naturality
100% natural origin
according to ISO 16126

## Ecoscore
Readily biodegradable
No bioaccumulation
Not ecotoxic




## Health
Water-based process
(no solvents)
Pesticides-free, organic cultivation

## Manufacturing
Extremely low waste (fruit residues fully re-used as organic fertilizers)
Physical / mechanical processing only
Mild conditions preserving bioactivity

* dsm-firmenich Green Chemistry scoring method



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# EXOVIVE™ LIFT

INCI name: Maltodextrin, Malus Domestica Fruit Extract, Citrus Reticulata Fruit Extract, Carica Papaya Fruit Extract
Product codes: 5018504

Inspired by regenerative medicine, this technology harnesses plant-derived exosomes which helps to nurture, reprogram and restore the skin.

## Environmental impact

**Carbon footprint**
14.5 kg CO2 eq./kg

**Biodegradability**
Readily biodegradable

**Water footprint**
47 m3 depriv./kg

**E-factor**
19 kg per kg product

## Traceability

**Highlights related to Supply Chain control**
Plant-derived exosomes are sourced from a combination of fruits from local cooperatives across multiple Italian regions, organically grown.

**Feedstock origin**
Italy

**Responsible sourcing**
No palm oil derivatives

## Social Impact

**Impact on health and wellbeing**
Re-densifies and plumps the skin for a more youthful and sculpted look. Targets eight hallmarks of aging to support skin longevity.

## Identity

**Natural-origin**
100.00% according to ISO16128

naturals

According to Regulation (EC) No 1272/2008 on the Classification, Labelling and Packaging of substances and mixtures (CLP), the biodegradability potential of EXOVIVE™ LIFT needs to be based on the biodegradability of its components.

The carbon and water footprint calculations are based on internally conducted LCA according to ISO 14040/44 guidelines, dsm-firmenich LCA policy and validated by an internal reviewer.
The biodegradability is based on relevant OECD tests.

Aligned with and contributing to the SUSTAINABLE DEVELOPMENT GOALS

3 GOOD HEALTH AND WELL-BEING

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Card version 1

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Alpine
Apple
Mediterranean
Tangerine
Sicilian
Papaya

# EXOVIVE™ LIFT: Nature’s finest, responsibly sourced ingredients

High-performing blend of fruits, cultivated with care and tradition
**100% organically grown and sourced from local Italian cooperatives**
**Higher bioactive content than in products from conventional agriculture**




Sourced in South Tyrol, Gala variety, benefiting a special Alpine-mediterranean climate with sunny days, cool nights and mineral-rich soils that enhance the metabolites production (such as catechin, quercetin, phloretin,...).




Sourced in Calabria, grown under an ideal mediterranean climate, Calabria's soil is rich in organic matter and contains essential minerals like magnesium, calcium, and potassium, which contribute to the high quality and intense flavor of the fruit. The fruit is rich in vitamin C, antioxidants, and fiber. Harvesting happens between September and May.




Sourced in Sicily, Formosa and Solo varieties, the paradise for the fruits, with an island’s warm and sunny climate which favors optimal ripening. The soil used is primarily rocky, which is beneficial as it helps maintain a cool temperature in the summer and warmth during the winter. The cut grass is left on the soil, eliminating the need for added fertilizer. Rich in lycopene, papain, vitamin A,...

# EXOVIVE™ LIFT
# Mode of action

**Two main activities:**

## 1. Secondary metabolites

Unique blend of actives, efficiently delivered into target skin cells for enhanced biological activity: enzymatic & non-enzymatic antioxidants, phenolic compounds, flavonoids and ATP (important to provide energy for radical scavenging mechanisms), leading to antioxidant activity/reduction of inflammatory mediators/ protein expression.

## 2. miRNAs, genetic instructions

Short non-coded RNA molecules, fine-tuning how genes are expressed, natural switches for cell behavior. In skin biology, they orchestrate regeneration, barrier integrity, inflammation control, and extracellular matrix remodeling key processes defining healthy, youthful skin.



# EXOVIVE™ LIFT Characterization

**Composition of main compounds:**
Maltodextrin 70.7% / Plant-derived Exosome extract 29.3%

- **Sugars**: Fructose, Glucose, Sucrose
- **Proteins and peptides** (after hydrolysis 19 amino acids out of 20 have been identified, proline and asparagine the most abundant, cysteine absent)
- **Lipids**
- **miRNAs**
- **Secondary metabolites** (as per table, with several skin benefits** such as antioxidant (NRF2 pathway), anti-inflammatory (TNF-α, IL6 inhibitors), protection against UV damage, wound healing, reducing signs of aging)

| Secondary metabolites | |
|---|---|
| Flavonoids | Nairutin, Hesperidin, Phloridzin*, Naringetin,* Hesperetin*, Trilobatin*, Sinensetin* |
| Triterpenoids | Limonin*, Nomilin* |
| Phenolic acids | Chlorogenic acid, Cryptochlorogenic acid |
| Antioxidants | Ascorbic acid, Catalase, SOD-1, Glutathione, Melatonin |
| Nucleotide | ATP |

*: Proposed identification based on LC-MS-MS analysis ** Based on literature






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# 49,000+ miRNAs identified in EXOVIVE™ LIFT

## Playing an essential role in skin regeneration, skin barrier and the extracellular matrix

| miRNAs | Skin regeneration | Skin barrier /immune/ inflammation | Extracellular Matrix | Epigenetic renewal |
|---|---|---|---|---|
| **miRNA159** [1,2] | | x | | |
| **miRNA164** [1,2] | **x** | x | **x** | |
| **miRNA 171** [3] | **x** | | **x** | |
| **miRNA 319** [1] | x | x | | |
| **miRNA 391** [1] | x | **x** | x | |
| **miRNA 398** [2] | x | | | **x** |
| **miRNA 399** [1] | x | | | |

Found in
1: Apple
2: Tangerine
3: Papaya

***Skin regeneration:***
miRNAs like *miRNA159, miRNA164,* and *miRNA171* regulate growth factors and transcriptional co-regulators involved in **fibroblast activation, collagen synthesis, and keratinocyte renewal**. This supports **smoother, denser**, and **more resilient skin**.

***Barrier and immune modulation:***
Certain miRNAs (e.g., *miRNA164, miRNA391, miRNA398*) fine-tune immune and stress-related genes, **balancing inflammatory cascades and autophagy**. This promotes **skin resilience**.

***Extracellular matrix homeostasis:***
miRNAs targeting *FN1* and glycosyltransferases **sustain structural proteins** like fibronectin and **regulate matrix glycosylation**, which contributes to **elasticity, volume, and structural cohesion of the dermis**.

***Epigenetic renewal and longevity:***
miRNAs like *miRNA398* influence **epigenetic regulators** supporting long-term cellular function and **slowing senescence-related** decline in fibroblast vitality. **Youthful looking skin for longer**

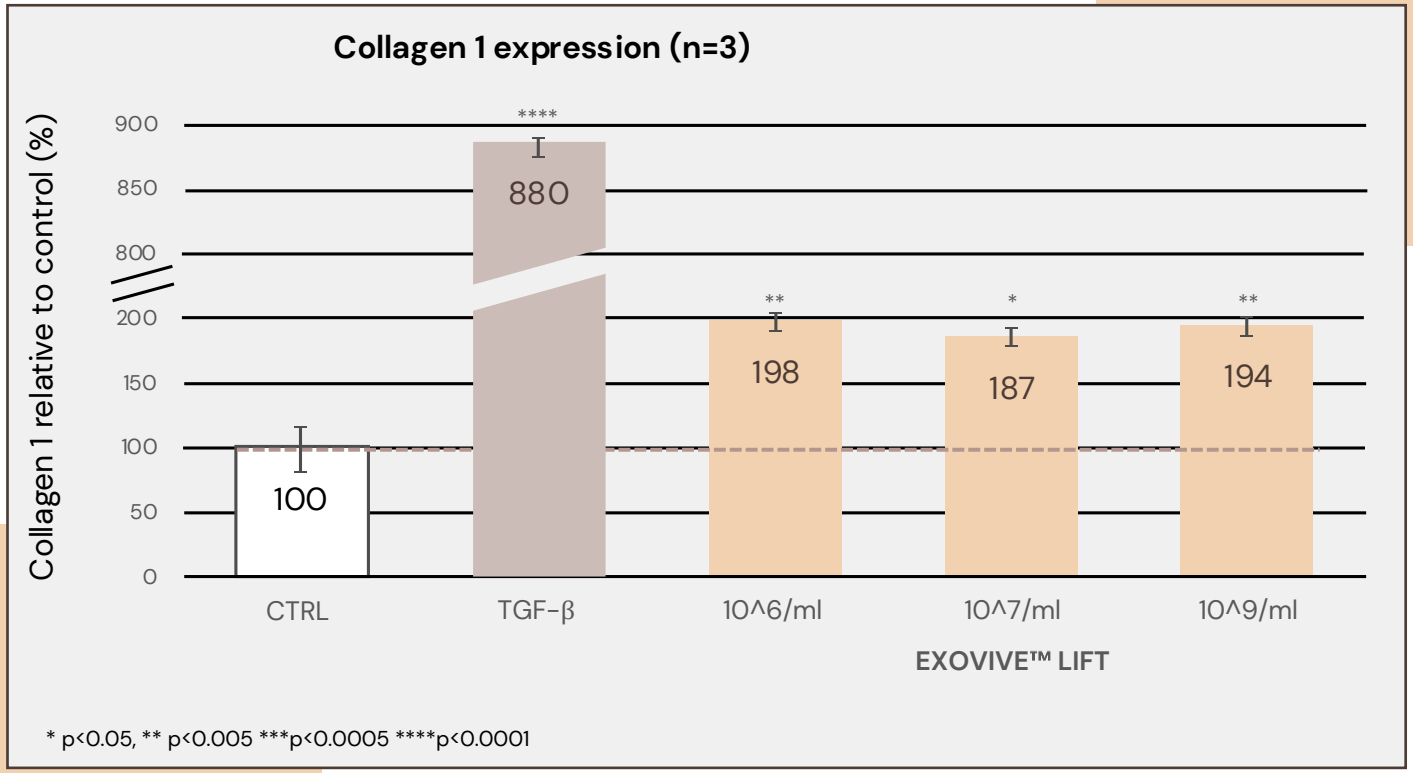


Source: Sanchez-Romo D. et al., Identification of potential target genes in *Homo sapiens*, by miRNA of *Triticum aestivum*: A cross kingdom computational approach, Non-Coding RNA Research 2022, 7, 89-97

# Proven efficacy



# EXOVIVE™ LIFT
# +90% Collagen-boost, at low concentration




Collagen 1 expression measured by flow cytometry in primary human dermal fibroblasts, concentration of EXOVIVE™ LIFT at 10^6, 10^7 and 10^9 plant-derived exosomes per ml



Invitro

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# *In vivo* study design

- Blind study with randomization
- Hemiface application, twice daily
- Female volunteers, mainly phototype II to III, aged from 37 to 69 years
- 45 volunteers per application
- 0.026% EXOVIVE™ LIFT (1 billion plant-derived exosomes per ml)
- Placebo controlled, cream-gel formulation
- 2 months study, time points: T0, 4 weeks, 8 weeks

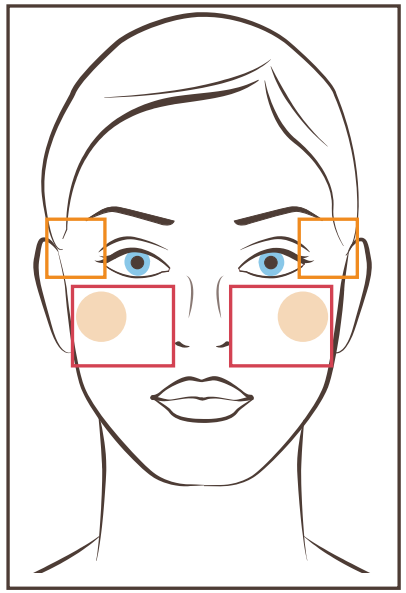
☐ Self-assessment questionnaire

☐ **Cutometer**
- Firmness
- Elasticity

**Antera 3D**
- Crow's feet wrinkle depth

**D-Squame**
- Tape stripping

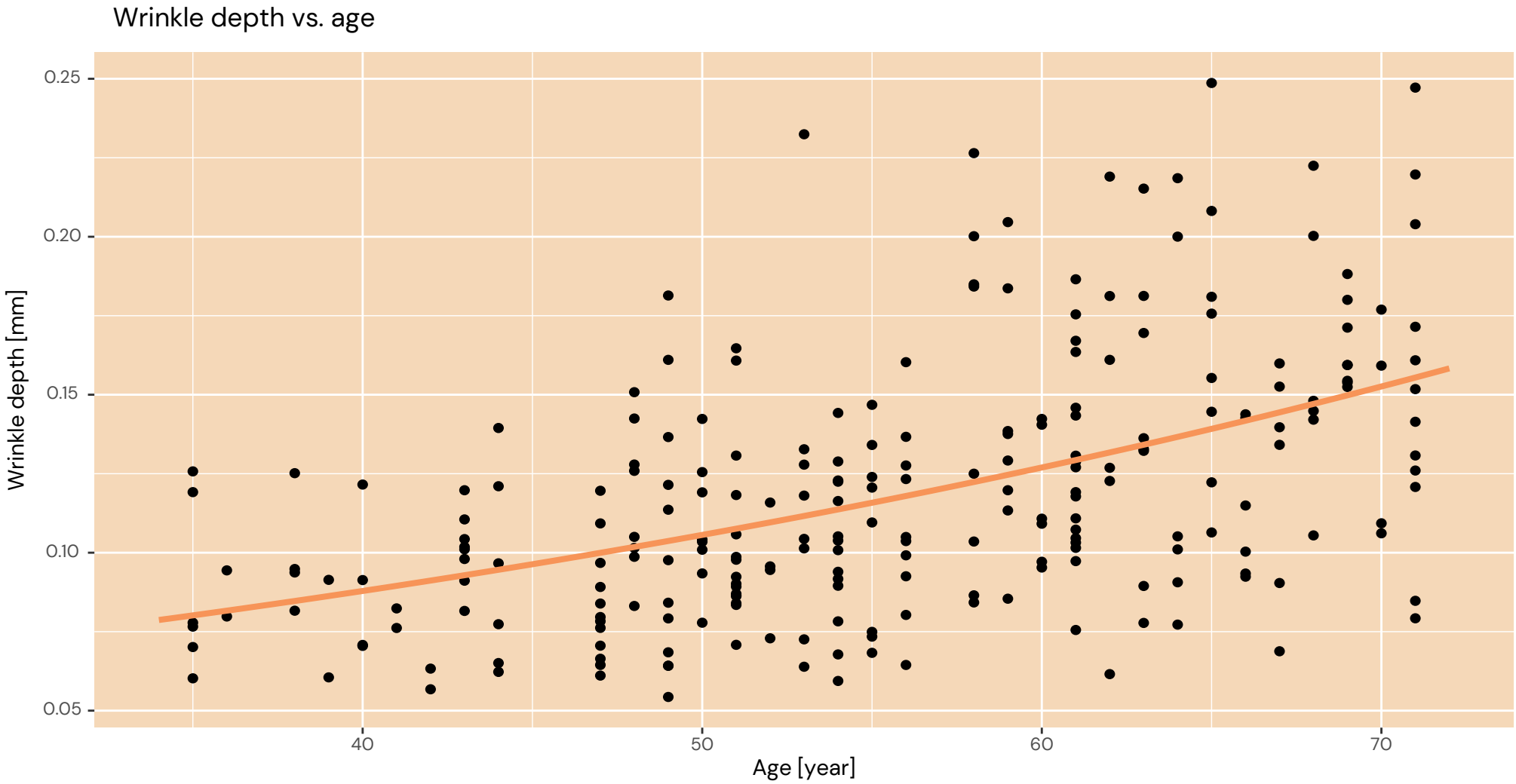
☐ **Antera 3D**
- Plumping volume





# Wrinkles depth increases by ≈ 2%* every year

## Cross-sectional data on total volunteers at baseline prior to treatment




Patent application pending on skin clock

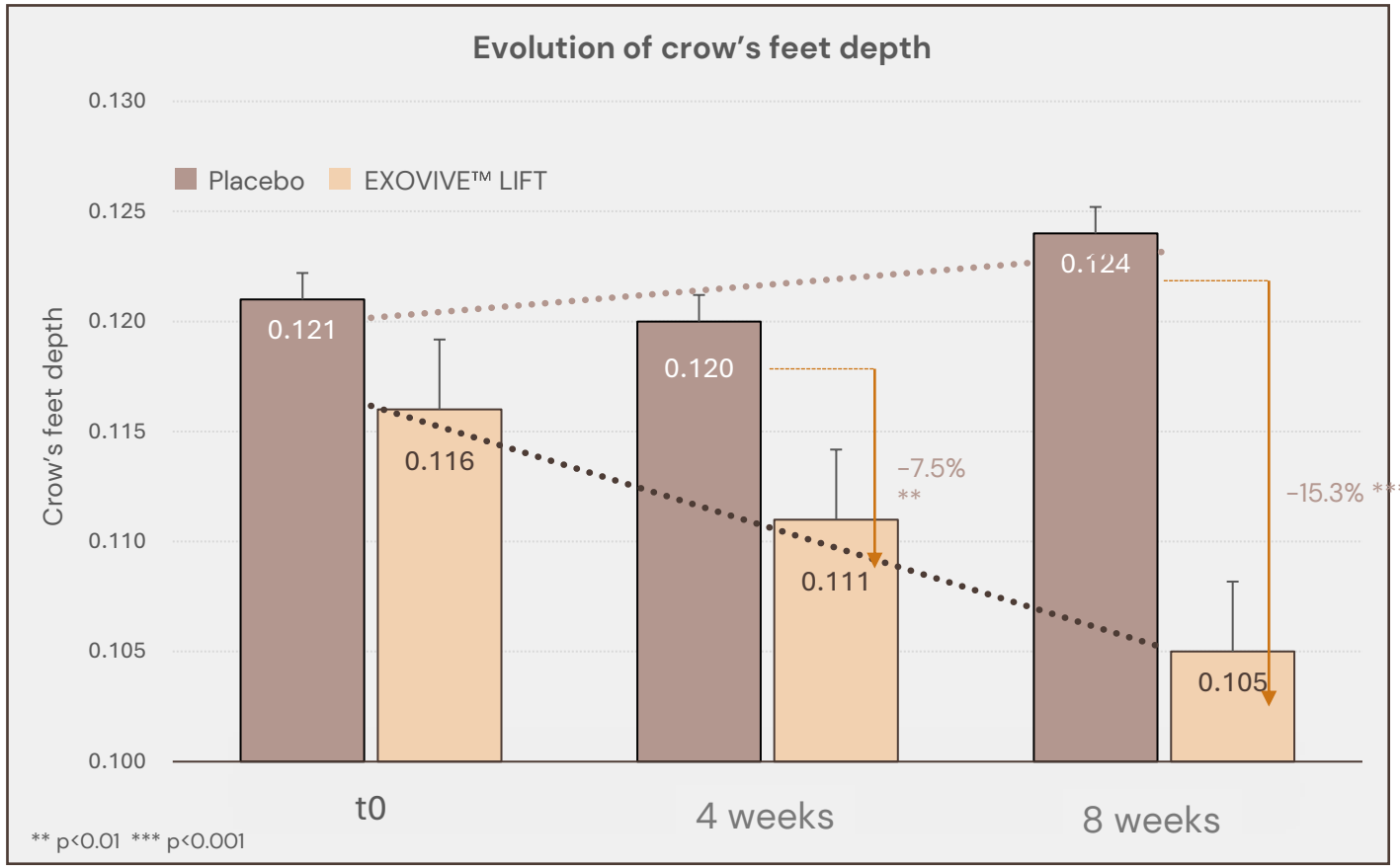
Based on crows' feet wrinkles depth measurement from both facial sides of all volunteers at baseline prior to treatment

*: 1.86%



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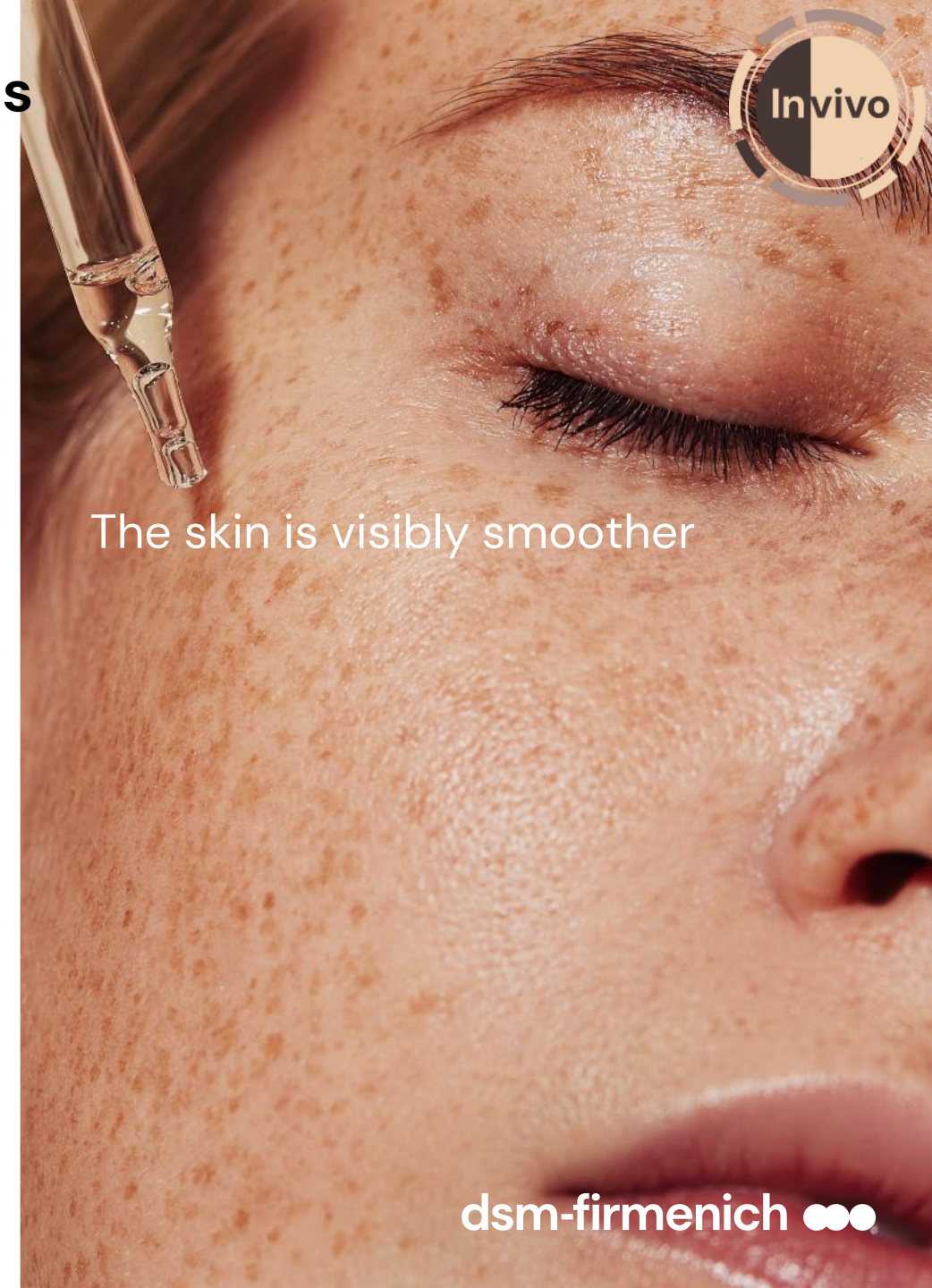
# Wrinkles look 8 years* younger after 2 months -15% significant reduction of wrinkles' depth




EXOVIVE™ LIFT significantly reduces the depth of crow's feet wrinkles by -15% vs placebo after 2 months (wrinkle appearance looks 4 years younger in just 1 month)

* The effect of the formulation with EXOVIVE™ LIFT is compared to the yearly rate of crows' feet wrinkle depth increase. Within 8 weeks, EXOVIVE™ LIFT reduces wrinkle depth compared to placebo by an amount comparable to approximatively 8 years of wrinkle depth increase



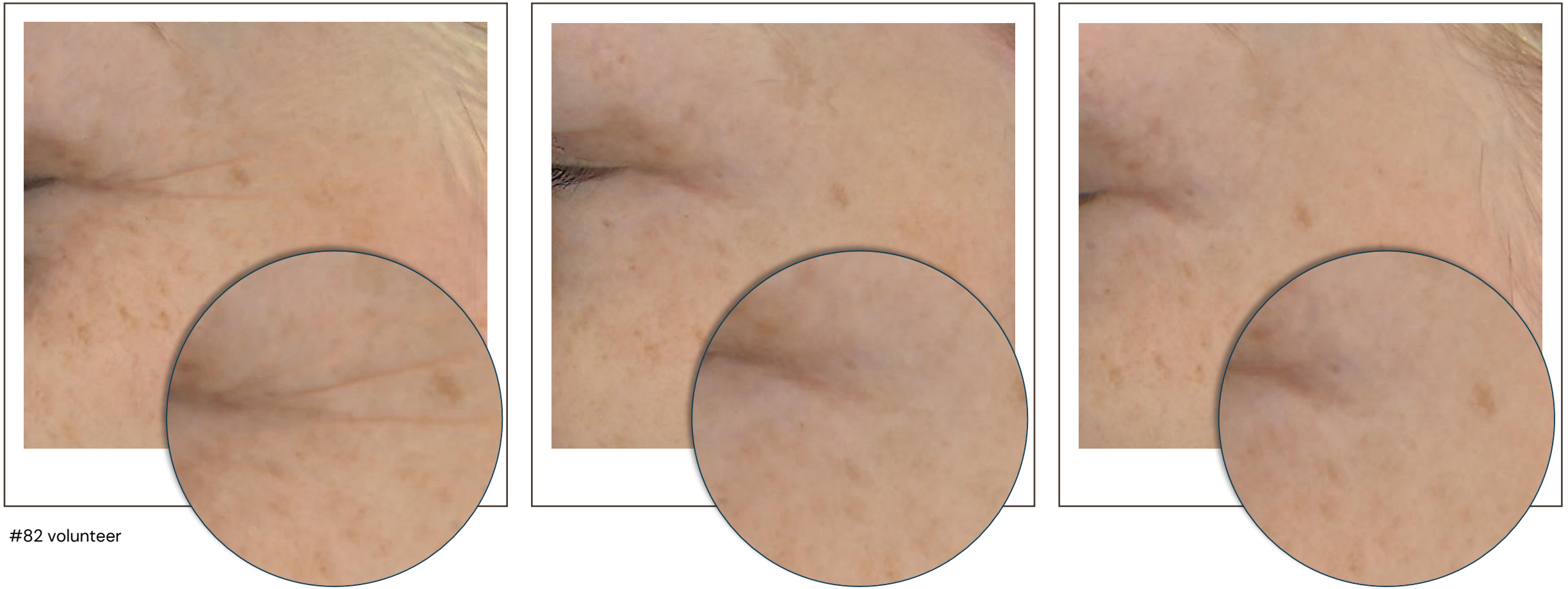


# EXOVIVE™ LIFT

## Impressive visible reduction of wrinkles' depth

(up to -64% on this volunteer, 60+ y.o.)

t0 | 4 weeks | 8 weeks



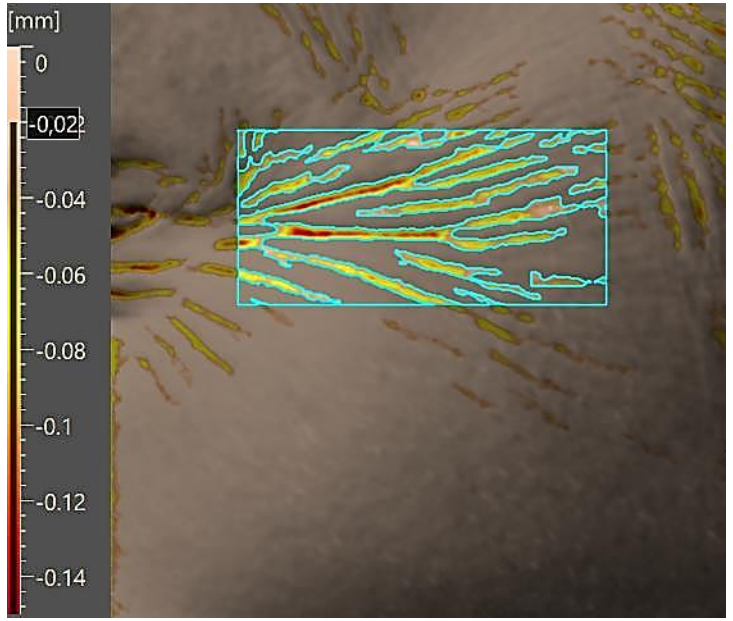
#82 volunteer



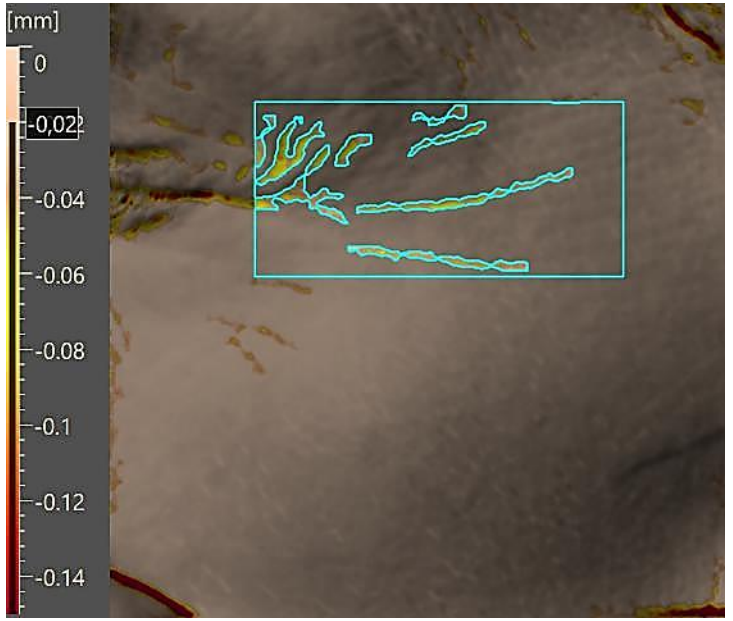
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# With EXOVIVE™ LIFT, up to -64% wrinkles' depth reduction

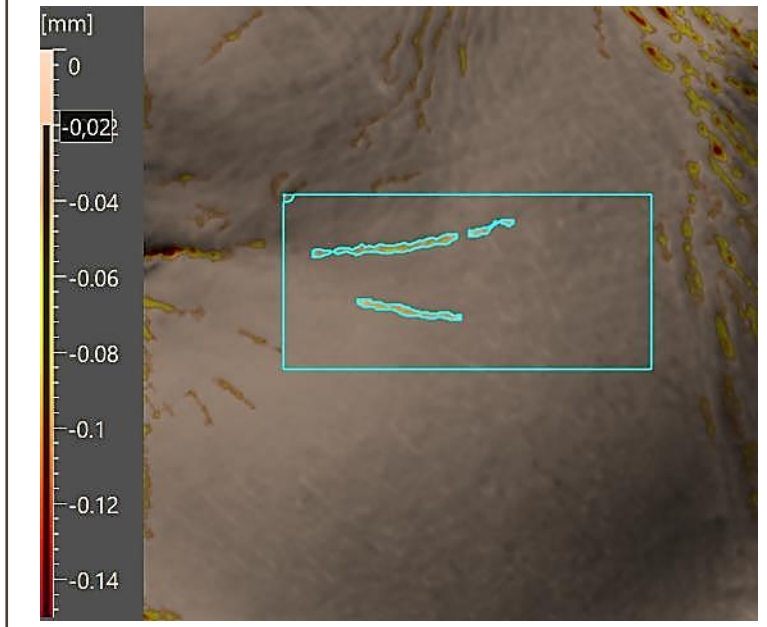
t0



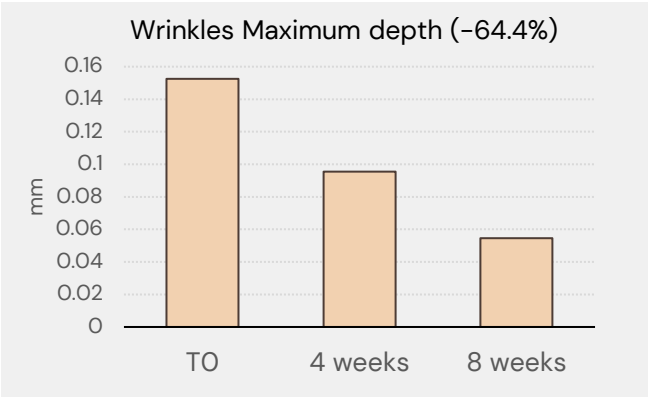

4 weeks

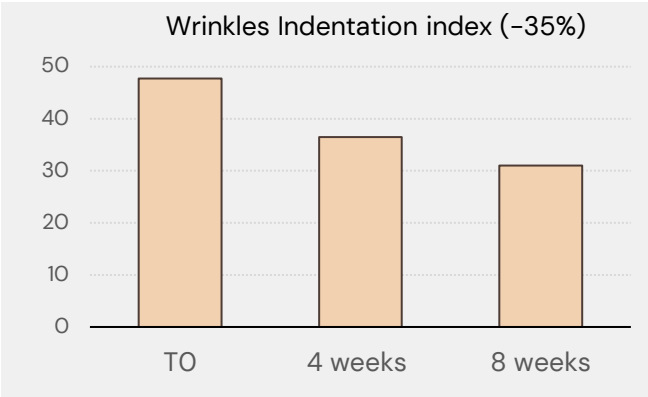



8 weeks




#82 volunteer (66 y.o.), skin type II




Wrinkles indentation is the combination of several criteria: length, area, volume, depth and count.

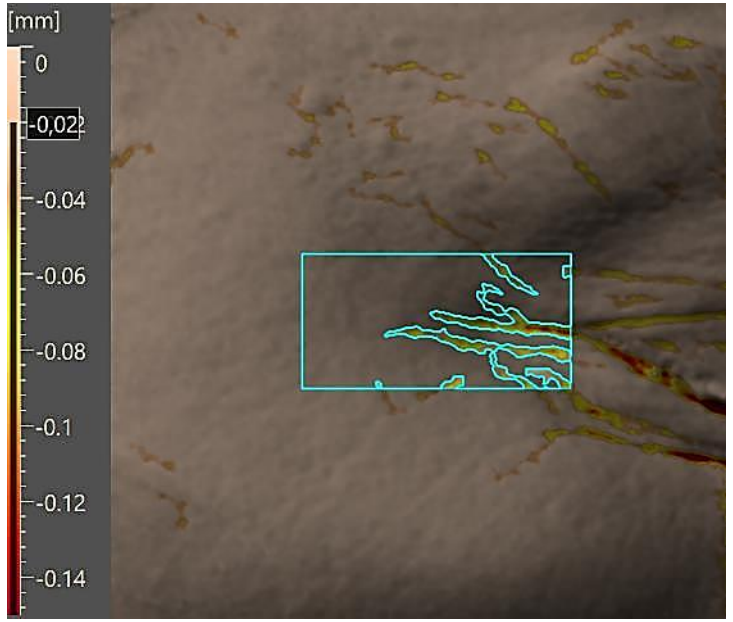
**EXOVIVE™ LIFT**
Wrinkles' Length -90%
Wrinkles' Area -93%
Wrinkles' Volume -95%
in just 4 weeks
for volunteer #82



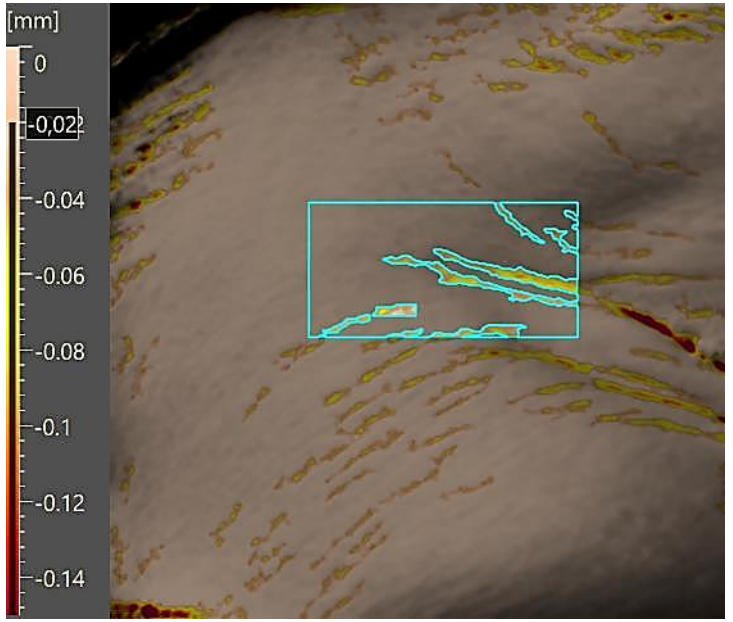
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# EXOVIVE™ LIFT reduces up to -32% the depth of fine lines

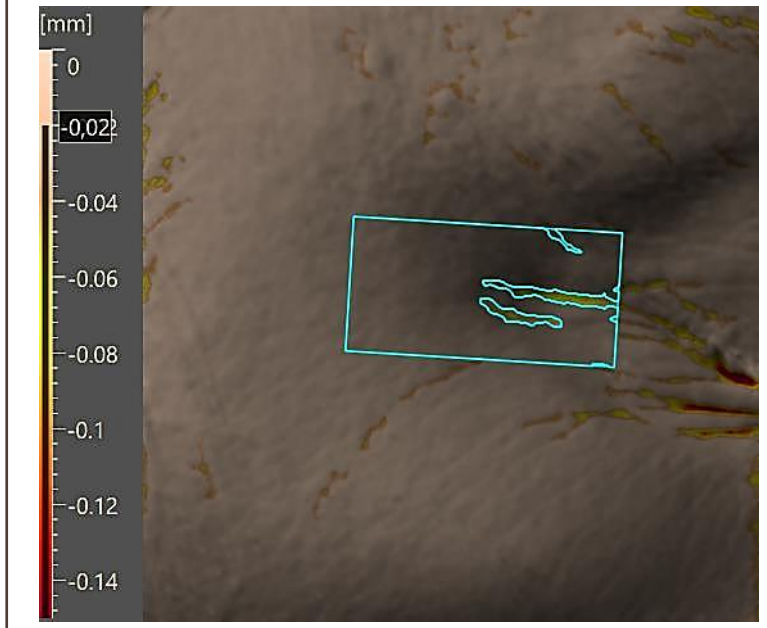
t0



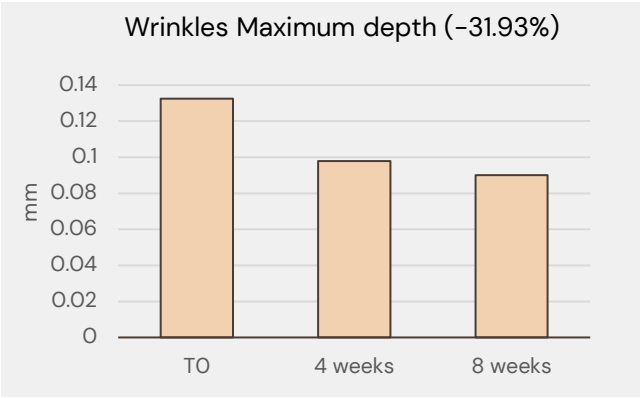

4 weeks

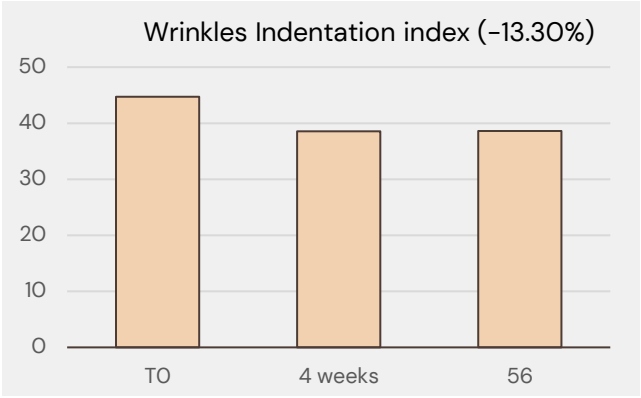



8 weeks




#31 volunteer
(55 y.o. ),
skin type II




Wrinkles indentation is the combination of several criteria: length, area, volume, depth and count.

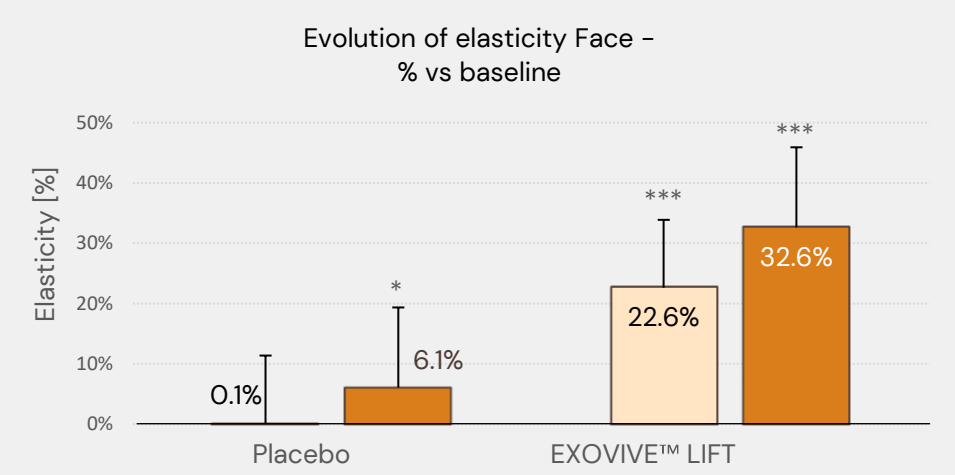
**EXOVIVE™ LIFT**
Wrinkles' Length -55%
Wrinkles' Area -55%
Wrinkles' Volume -62%
in 8 weeks
for volunteer #31

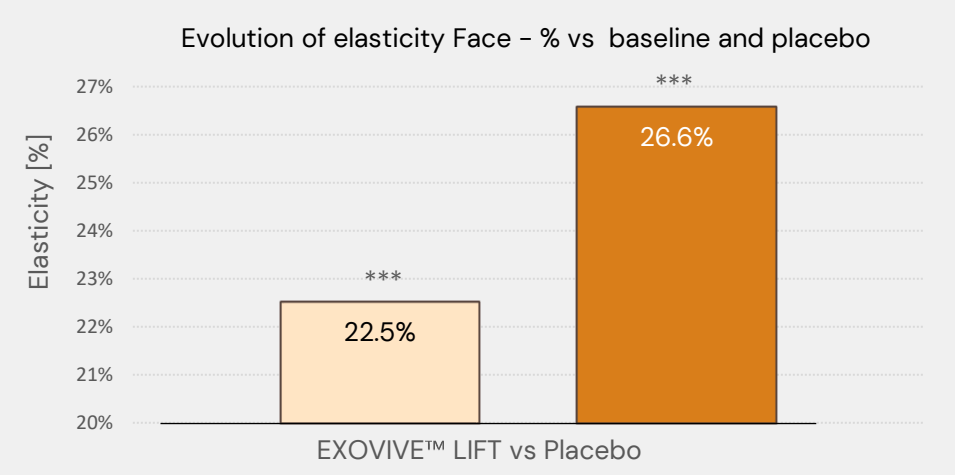


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# With EXOVIVE™ LIFT, skin is significantly revamped in just 4 weeks

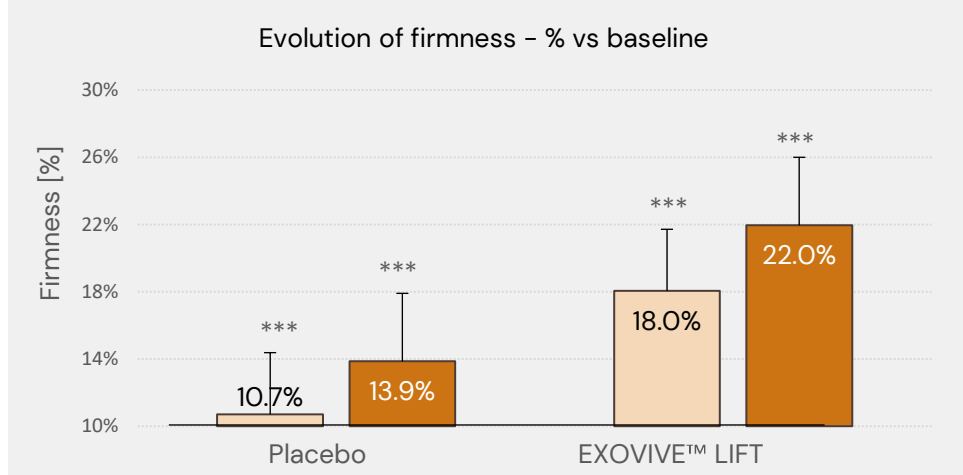
## Provides a rejuvenated and lifted skin appearance

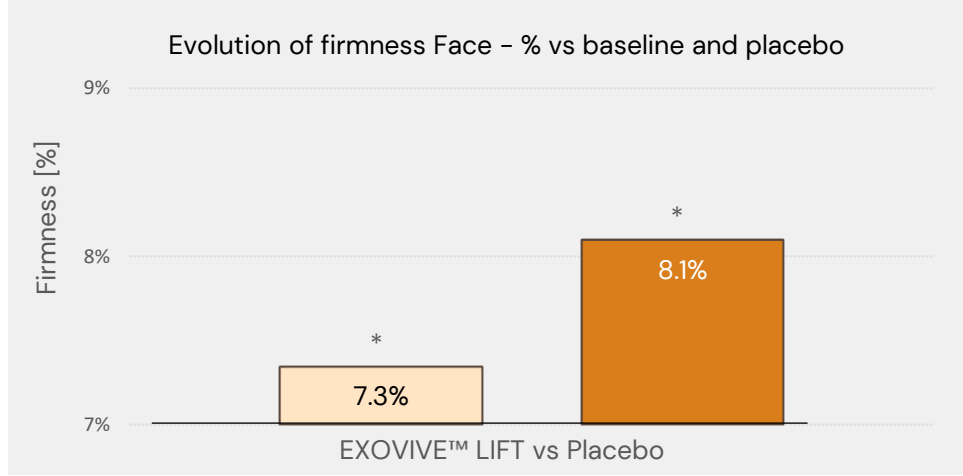



In just **4 weeks: skin elasticity** is boosted by **+23%** vs T0 & placebo & **skin firmness** by **+18%** vs T0

After **8 weeks**: **skin elasticity** by **+33%** and **skin firmness** by **+22%** vs T0




* p<0.05 ** p<0.01 *** p<0.001

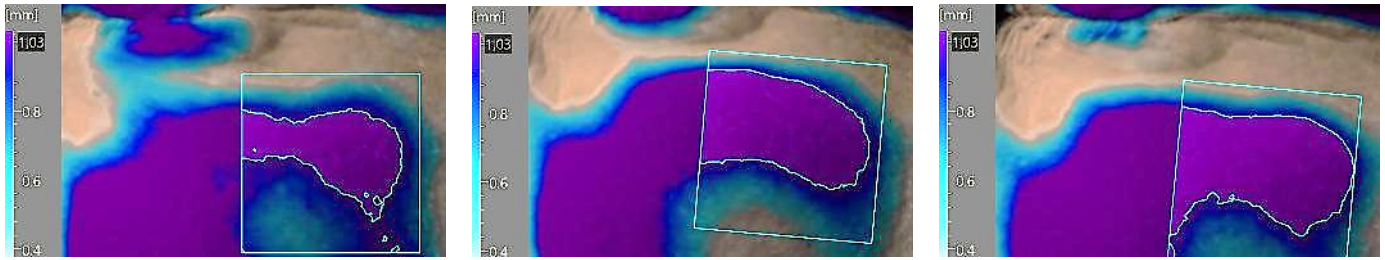
4 weeks

8 weeks

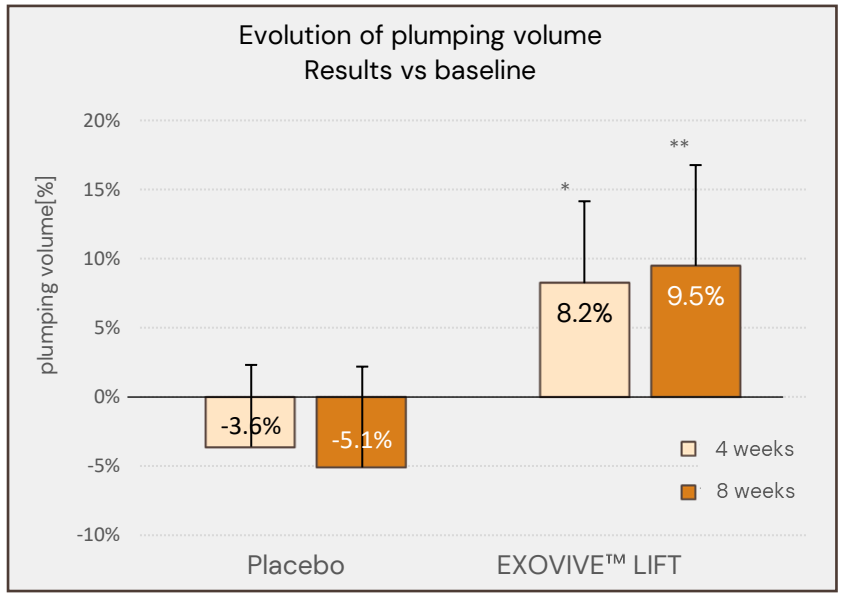


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# EXOVIVE™ LIFT
# Promotes plumped youthful-looking skin



For #55 volunteer (43 y.o.), images of plumping volume by Antera 3D, color code from light blue (the least plumped) to purple (the most plumped).
The expansion of the purple area signifies that more skin is plumped after treatment.




In just **4 weeks:**
EXOVIVE™ LIFT significantly increases the **skin plumping** by **+12%** vs placebo (+8% vs T0)

In **2 months**:
**+15%** vs placebo (+10% vs To)

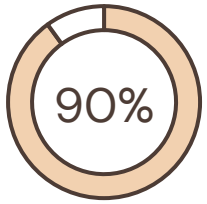
The skin is visibly plumped with a rejuvenated appearance



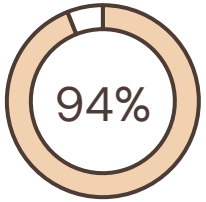
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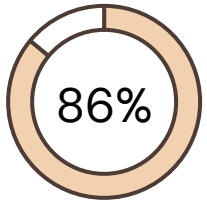
# EXOVIVE™ LIFT convinces the volunteers!

**…overall skin appearance improved**



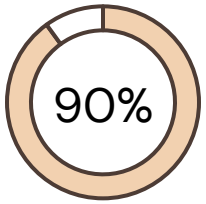

**…my skin feels softer**

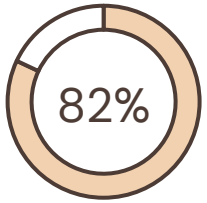



**…my skin feels revitalized**

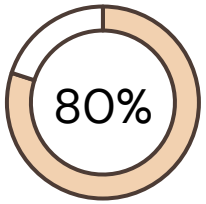
**…my skin feels firmer**




**…wrinkles & fine lines improved**

**…I would use it as part of my cosmetic routine**

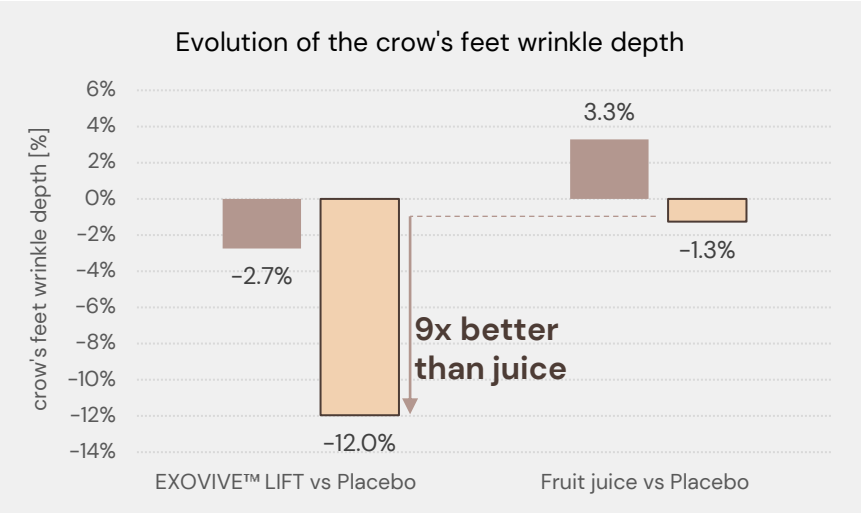


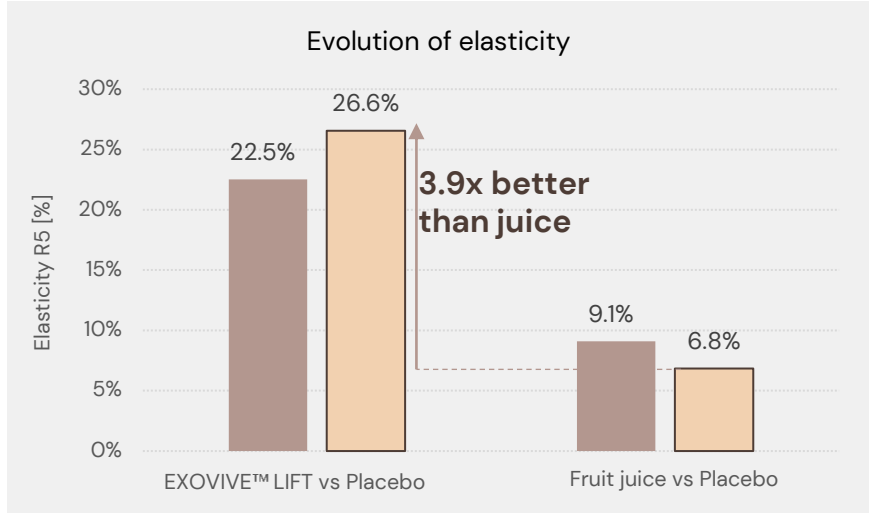

By using EXOVIVE™ LIFT at 0.026% for 2 months, 90% of volunteers agree: skin feels softer, firmer and overall skin appearance has improved!

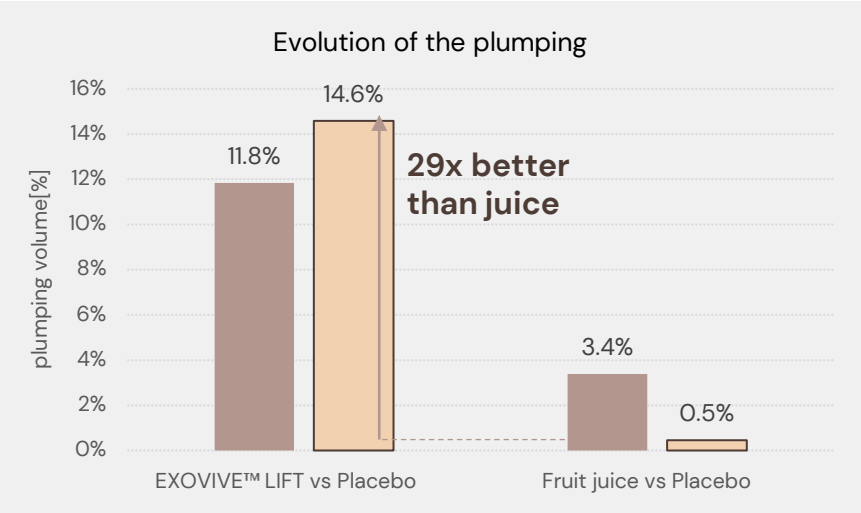


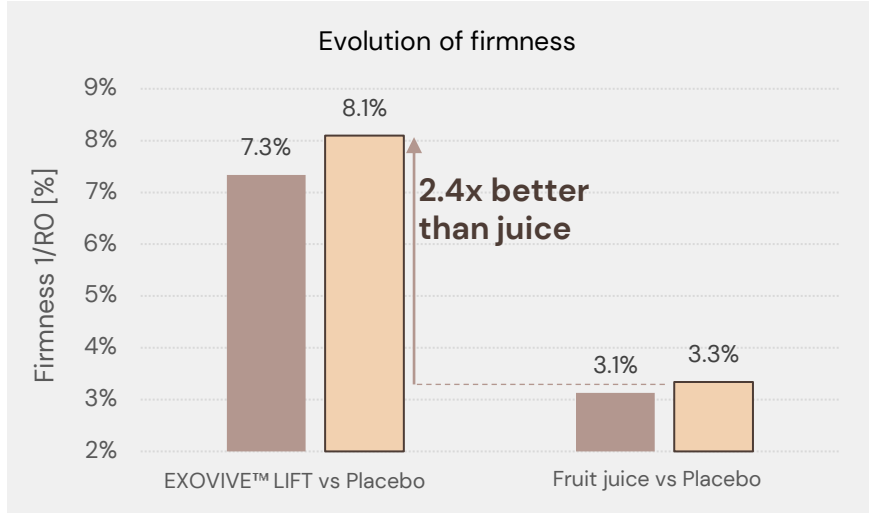
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# EXOVIVE™ LIFT significantly outperforms standard fruit extract




Fruit juice at the same concentration as EXOVIVE™ LIFT: 0.026%

4 weeks
8 weeks

EXOVIVE™ LIFT **significantly outperforms the corresponding standard fruit mix** extract, in all aging end-points.

**9x better** wrinkle reduction
**3.9x better** skin elasticity
**29x better** skin plumping
**2.4x better** skin firmness
after **2 months**



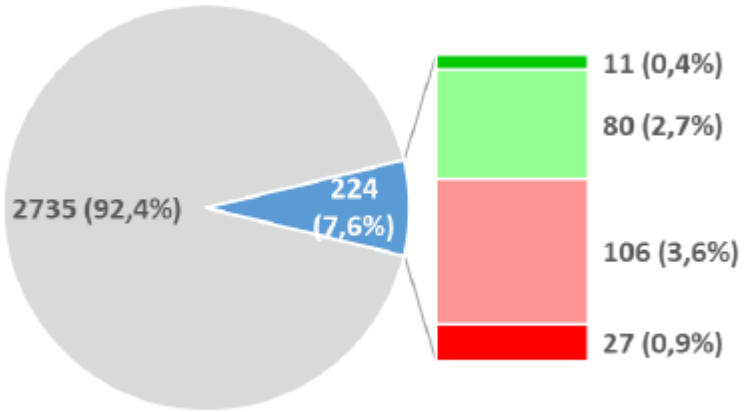
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# More than 200 proteins significantly modulated by EXOVIVE™ LIFT

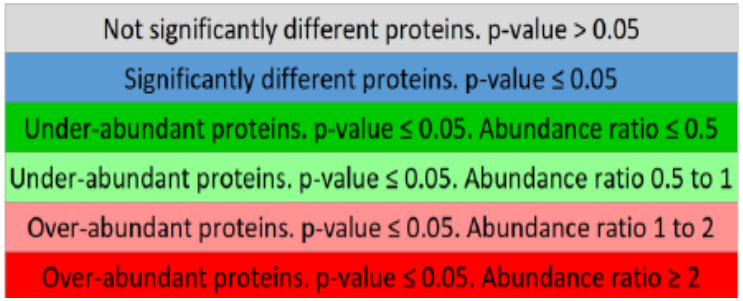
## Method of Analysis: Proteomics on tape strips

240 skin tape-strips samples on 12 patients, 5 tape-strips were collected from each cheek (exosome-based treatment, and placebo) at two time points (Baseline and 8 weeks). The first tape-strip from each condition was not analyzed.

2943 human proteins were identified in all samples combined.
We compared first significant changes happening during the 2-month study for each placebo and EXOVIVE™ LIFT, and then we compare these 2 results and took the proteins significantly over- or under-abundant (fold changes ≥ 2 or ≤ 0.5):

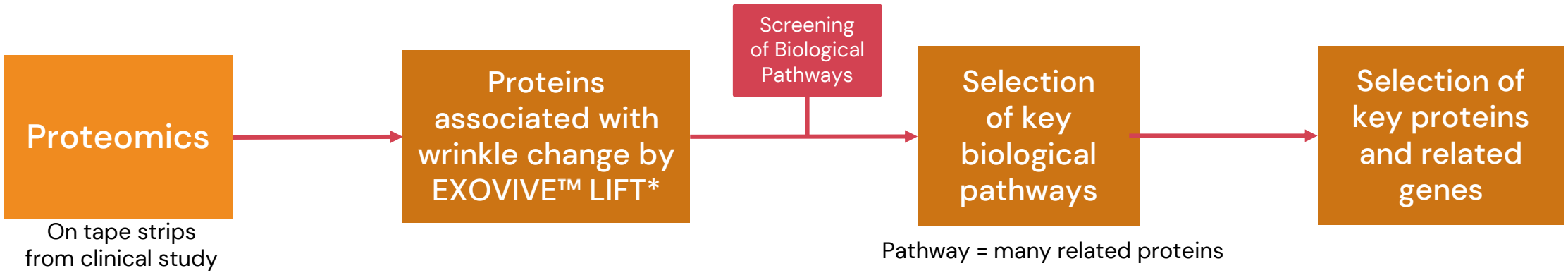



EXOVIVE™ LIFT changes after 2 months vs Placebo




An LC-MS/MS instrument continuously analyses the fractions of a nano-HPLC separation of peptides resulting from the enzymatic digestion of a protein extract.
Protein Identification Data were processed with Proteome Discoverer 3.0. Proteins were identified by SEQUEST-HT search algorithm, comparing acquired MS/MS spectra to theoretical MS/MS peptide spectra derived in silico from a database of protein sequences.

# 1- New way to assess proteomics – Mode of action
# Connection of clinical phenotype with molecular mode of action




We found out how the improvement of wrinkles by EXOVIVE™ LIFT is correlated to some key biological pathways

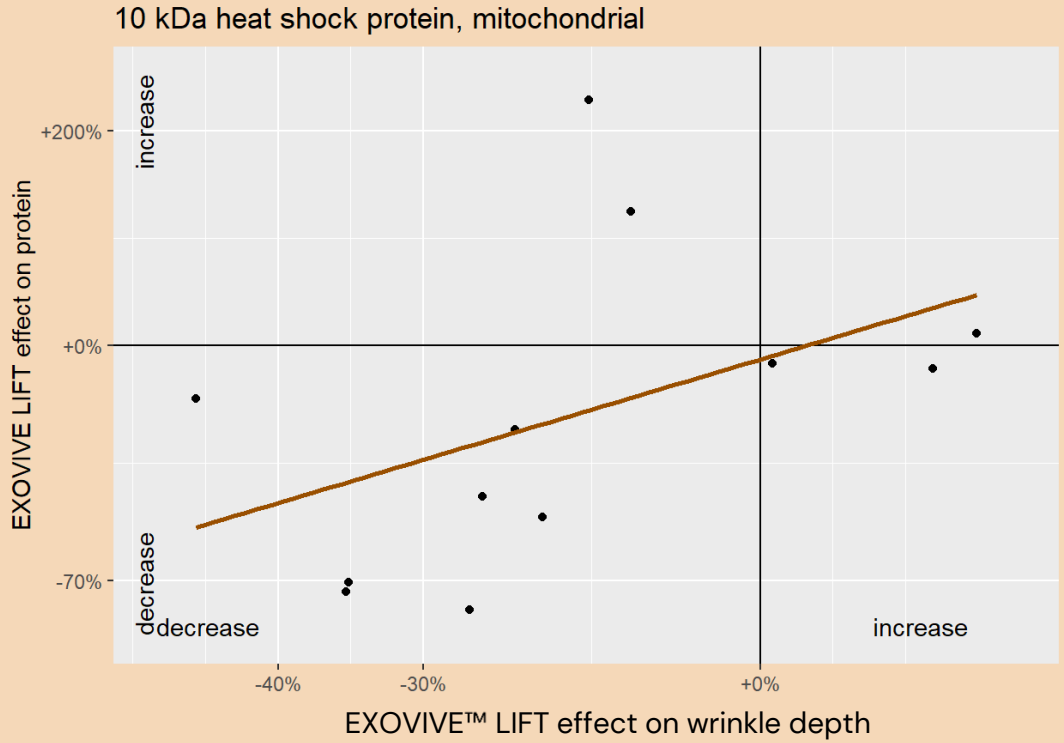
Based on 12 volunteers having placebo and EXOVIVE™ LIFT on the same face



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# Correlation between proteins and wrinkles change, both with EXOVIVE™ LIFT

Change of crow's feet wrinkles and proteins abundance after 2 months with EXOVIVE™ LIFT vs their change after 2 months with placebo




proteins correlated with deeper wrinkles

**1 dot = 1 volunteer**

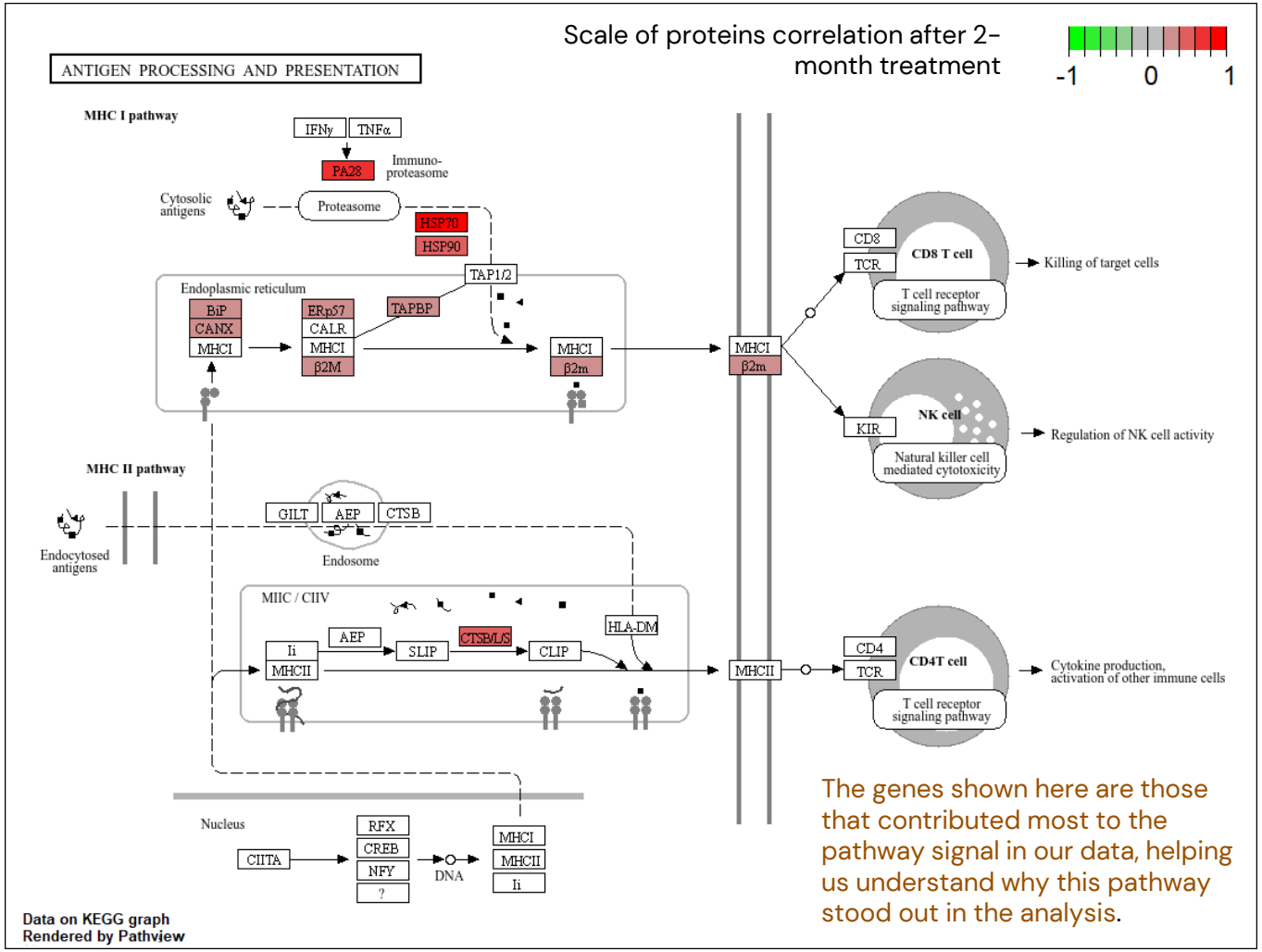
# Identification of biological pathways modulated by EXOVIVE™ LIFT

## Example of a pathway involved in chronic inflammation: MHC1 with key proteins correlated with wrinkles change by EXOVIVE™ LIFT

Instead of looking at single proteins, we combine correlations of proteins into results for pathways, providing more reliable and potent insights
**Pathway = many related proteins**

Example: Antigen processing and presentation (MHC1, KEGG database)
MHC1: upstream pathway of many immune and inflammaging processes in skin: barrier integrity, chronic inflammation, pigment,...

Proteins significantly correlated to wrinkle change and involved on this pathway are highlighted in red and pinkish color




The genes shown here are those that contributed most to the pathway signal in our data, helping us understand why this pathway stood out in the analysis.

MHC1: major histocompatibility Class1 antigen,
KEGG: Kyoto Encyclopedia of genes and genomes

# EXOVIVE™ LIFT the perfect fit for skin longevity

## Clinical improvements in wrinkle depth are associated with several hallmarks of aging

### Chronic inflammation

Decreased activity in pathways typically engaged during immune stress and protein misfolding, consistent with lower cellular stress ("inflammaging")

Pathways:
- less antigen processing and presentation/ MHC1 (***, KEGG database)
- less protein folding chaperone (*, GO database), needed when the cell is under stress. When damaged or misfolded proteins are efficiently cleared by the proteasome, the cell experiences less stress and therefore requires fewer protein-folding chaperones.

### Loss of proteostasis

Increased capacity of the proteasome–peptidase network, the cell's main machinery for degrading damaged or misfolded proteins

Pathways:
- Proteasome (*, KEGG database)
- Peptidase complex (*, GO database)
- Endopeptidase complex (*, GO database)
- Proteasome core complex (**, GO database)
- Antigen Processing, UB ATP independent proteasomal degradation (*, Reactome database)

### intercellular communication alteration

Upregulation of the cell's own built-in logistics system for receiving and routing tiny biological packages, such as exosomes

Pathways:
- SNARE binding (*, GO database)
- Signaling adaptor activity (*, GO database)
- Vacuole (*, GO database)

KEGG: Kyoto Encyclopedia of genes and genomes
GO: Gene ontology

# Transcriptomics: cross-kingdom miRNA analysis

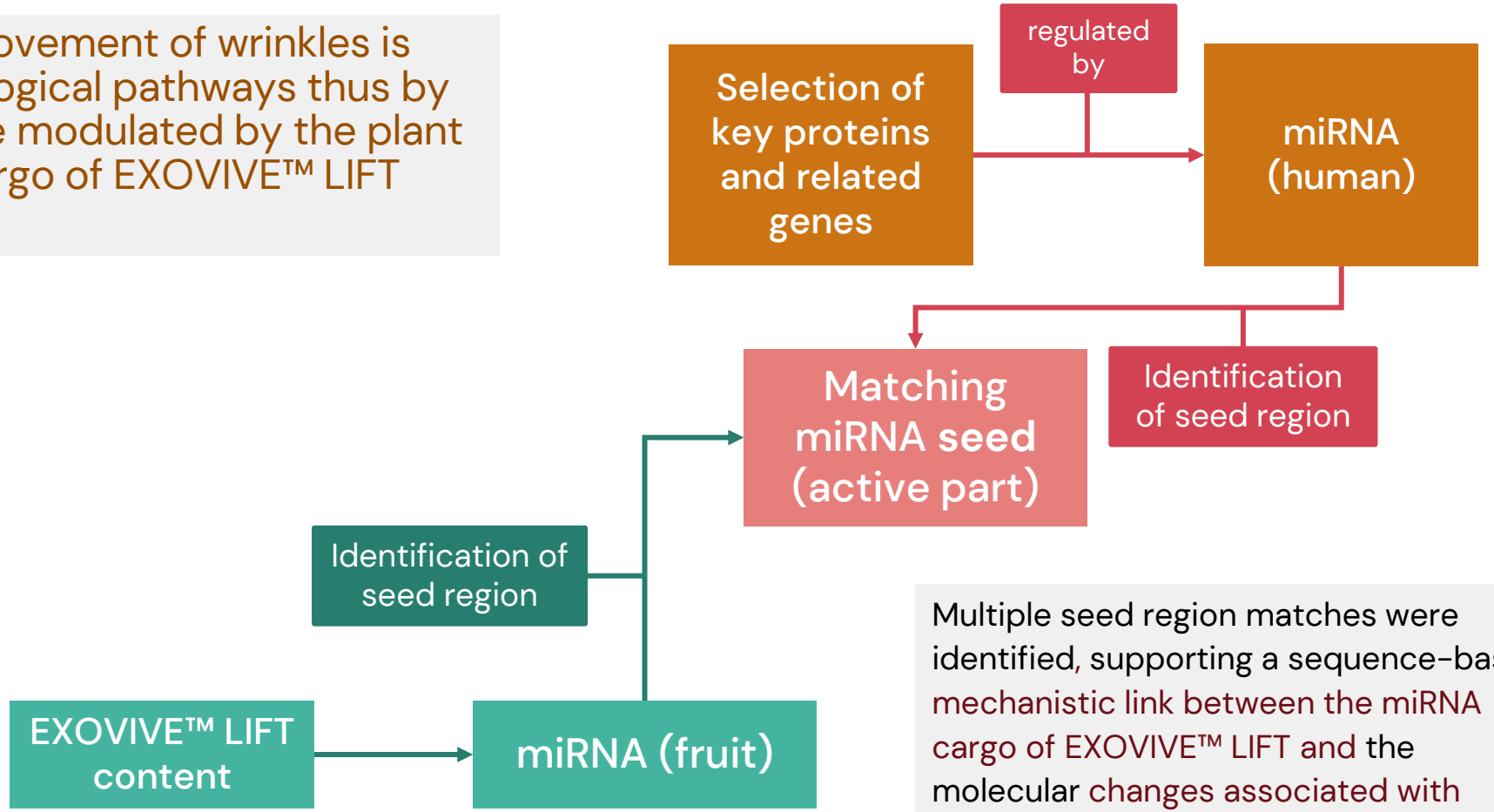
We found out how the improvement of wrinkles is correlated to some key biological pathways thus by key proteins which might be modulated by the plant miRNAs contained in the cargo of EXOVIVE™ LIFT vesicles




miRNA seed region binding to mRNA

miRNA is a small RNA (RiboNucleic Acid) molecule found in cells:

Non-coding RNA (doesn't make protein itself)
Acts like a control dimmer switch that helps decide how much protein a gene should make
The seed region is the critical part that determines which mRNA it binds to



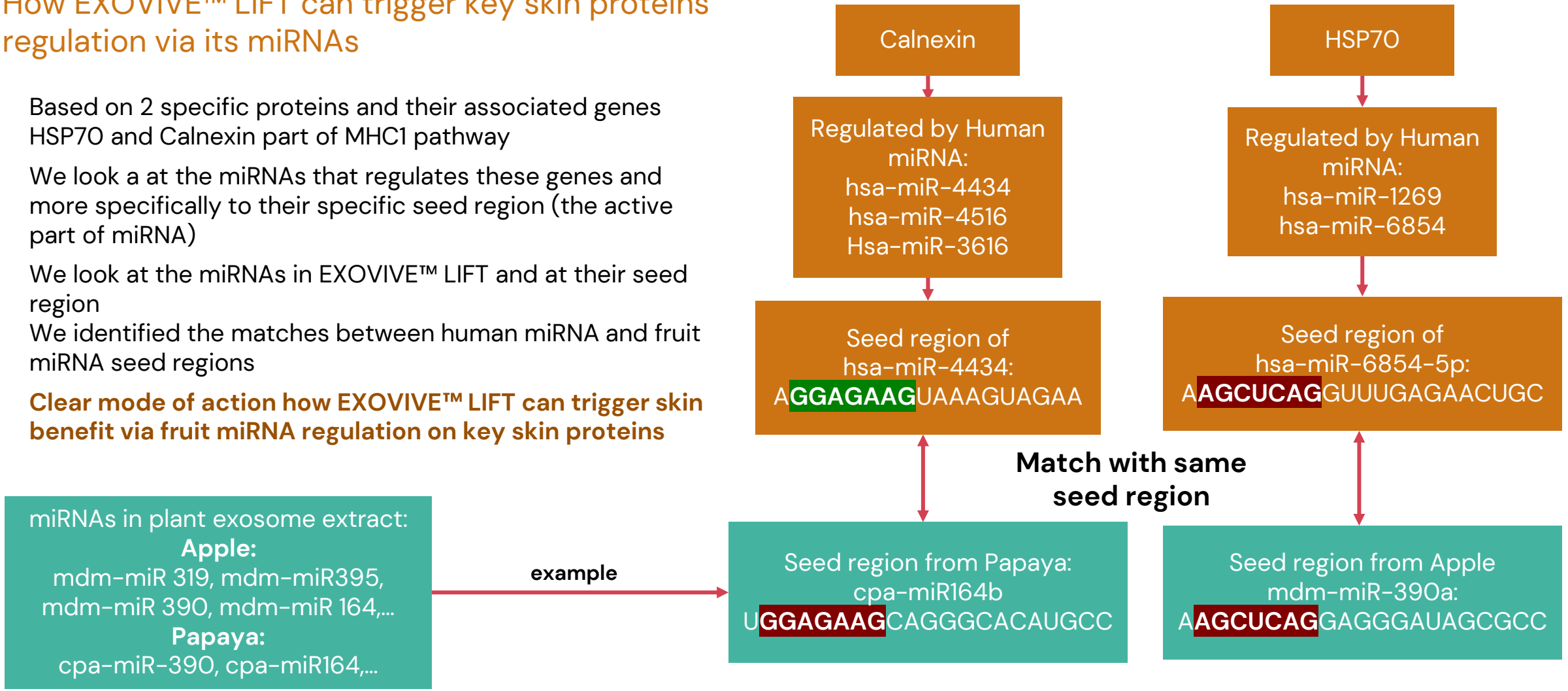

Multiple seed region matches were identified, supporting a sequence-based mechanistic link between the miRNA cargo of EXOVIVE™ LIFT and the molecular changes associated with reduced wrinkle depth

Based on 12 volunteers having placebo and EXOVIVE™ LIFT on the same face

# Exploratory cross-kingdom correlation between human miRNAs and fruit miRNAs based on tape strips

## How EXOVIVE™ LIFT can trigger key skin proteins regulation via its miRNAs

- Based on 2 specific proteins and their associated genes HSP70 and Calnexin part of MHC1 pathway
- We look a at the miRNAs that regulates these genes and more specifically to their specific seed region (the active part of miRNA)
- We look at the miRNAs in EXOVIVE™ LIFT and at their seed region
- We identified the matches between human miRNA and fruit miRNA seed regions
- **Clear mode of action how EXOVIVE™ LIFT can trigger skin benefit via fruit miRNA regulation on key skin proteins**






Source: Li D, Wang F, Xu Y, Zhou H, Ma X, Shen Y. "A Timely Review of Cross-Kingdom Regulation of Plant-Derived microRNAs." Frontiers in Genetics 2021;12:613197.

# 2- Proteomics: EXOVIVE™ LIFT the perfect fit for skin longevity

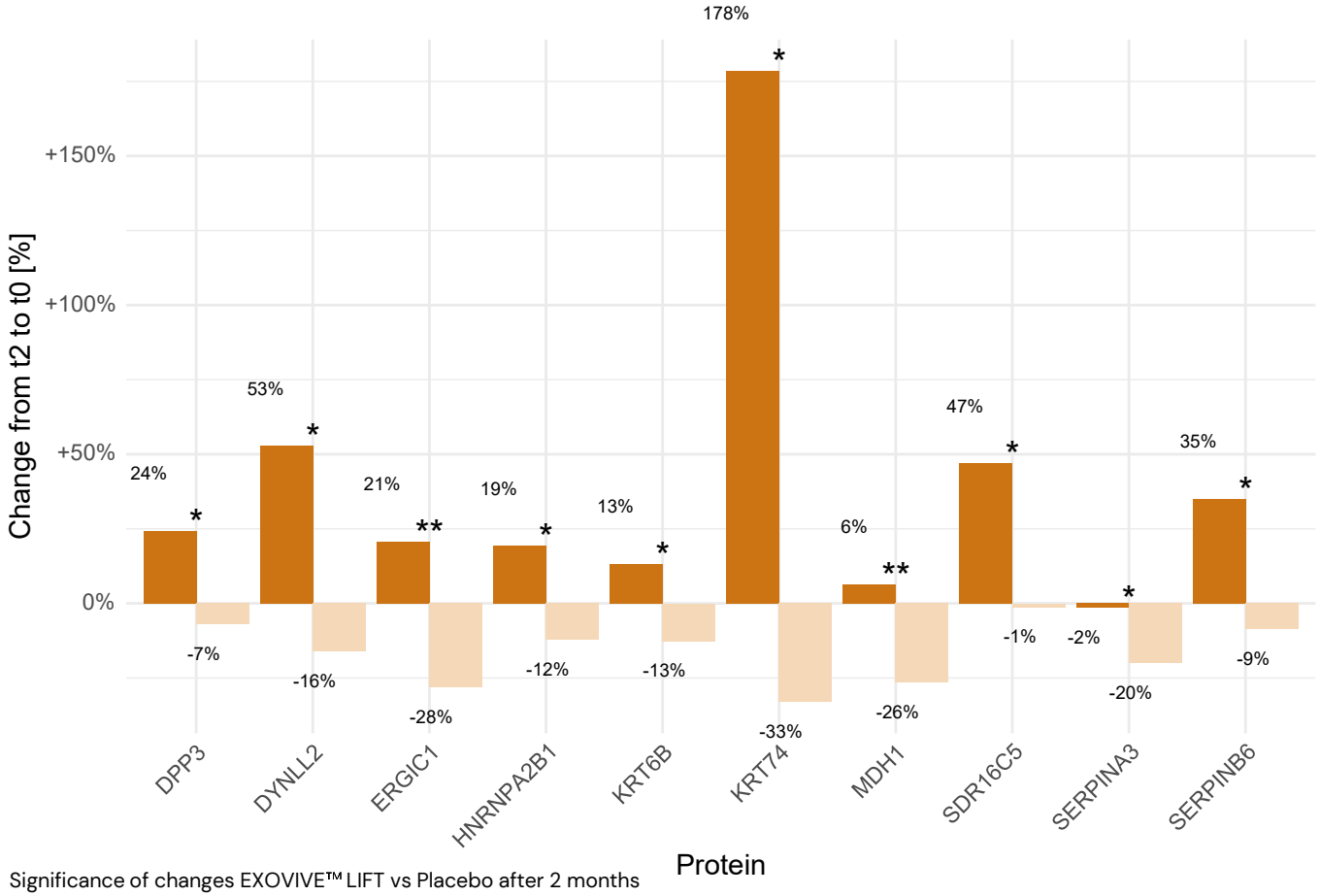
## Beyond altered intercellular communication, EXOVIVE™ LIFT tackles 8 other hallmarks of ageing - based on proteins significantly upregulated by EXOVIVE™ LIFT

| Hallmarks of Ageing | Proteins | | Function |
|---|---|---|---|
| Loss of proteostasis | ERGIC1 | Endoplasmic reticulum-Golgi intermediate compartment protein 1 | Maintains youthful protein processing and secretion for improved ECM and skin smoothness. |
| | DPP3 | Dipeptidyl peptidase 3 | Fine-tunes peptide signaling for repair and turnover in the dermis, for healthy ECM turnover, lifts firmness and bounce. |
| | SERPINA3 | Alpha-1-antichymotrypsin | Serine protease inhibitor that protects ECM components like collagen from enzymatic degradation. |
| | SERPINB6 | Serpin B6 | Intracellular serine protease inhibitor, key for protecting cells from proteolytic stress and damage. |
| Mitochondrial dysfunction | MDH1 | Malate dehydrogenase | Enzyme in the mitochondrial citric acid cycle. Boosts cellular energy for optimal fibroblast renewal and wrinkle resistance. |
| Epigenetic alteration | SDR16C5 | Retinal short chain dehydrogenase reductase isoform 1, isoform CRA_c | Powers retinoid pathways, improving cell turnover and "resetting" skin's youth code. |
| Stem Cell exhaustion | DYNLL2 | Dynein light chain 2, cytoplasmic | Drives intracellular trafficking for efficient cell division and renewal. |
| | KRT74 | Keratin 74 | Structural keratin in hair follicle and epidermis. Strengthens skin structure and resilience (skin barrier), fights thinning and fragility in ageing skin. |
| | KRT6B | Keratin, type II cytoskeletal 6B | Keratins contribute to skin barrier and structural integrity, supporting skin resilience. Fights thinning and fragility in ageing skin. |
| Genomic instability | HNRNPA2B1 | Heterogeneous nuclear ribonucleoproteins A2/B1 | Enhances RNA processing. |
| Telomere attrition | HNRNPA2B1 | Heterogeneous nuclear ribonucleoproteins A2/B1 | Preserves telomere function and slows cellular senescence. |
| Chronic inflammation | SERPINA3 | Alpha-1-antichymotrypsin | Reduces chronic inflammation, speeds up wound healing. |
| | SERPINB6 | Serpin B6 | Preserves cell viability and tissue integrity—critical to both elasticity and regeneration dynamics. |
| Cellular senescence | SERPINB6 | Serpin B6 | Supports healthy longevity of skin cell. |

# EXOVIVE™ LIFT strongly overexpressed key proteins *in vivo*

## Proteomics on tape strips

From around 3'000 proteins identified on tape strips, we have found more than 10 Proteins significantly upregulated by EXOVIVE™ LIFT after 2 months vs placebo.




Significance of changes EXOVIVE™ LIFT vs Placebo after 2 months
*: p <0.05, ** p<0.01

EXOVIVE™ LIFT
Placebo

10 key selected proteins significantly overexpressed by EXOVIVE™ LIFT boosting skin longevity

**Genes: Proteins coded**

DPP3: Dipeptidyl peptidase 3
DYNLL2: Dynein light chain 2, cytoplasmic
ERGIC1: Endoplasmic reticulum-Golgi intermediate compartment protein 1
HNRNPA2B1: Heterogeneous nuclear ribonucleoproteins A2/B1
KRT6B: Keratin, type II cytoskeletal 6B
KRT74: Keratin 74
MDH1: Malate dehydrogenase
SDR16C5: Retinal short chain dehydrogenase reductase family 16C Member 5,
SERPINA3: Alpha-1-antichymotrypsin
SERPINB6: Serpin B6



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# EXOVIVE™ LIFT by dsm-firmenich
# Elevating science

**Setting new standards in the field of plant-derived exosomes:**

- **Characterization & standardization**
- **One billion vesicles in a single application (1 ml)**
- **>40k miRNAs identification with clear mode of action**
- **+90% Collagen boost***
- **Outstanding clinically proven** after 2 months efficacy:**
  - **Re-densifies & plumps the skin**
  - **Boosts skin elasticity up to +33% and firmness by 22%**
  - **Reverses 8 years of wrinkles**
  - **Tackles 9 hallmarks** by **up-regulating key proteins** involved in skin regeneration, skin barrier, extracellular matrix protection,…)
  - **Overperforms the equivalent standard fruit extract**

** In vitro ** in vivo*



# dsm-firmenich plant-derived exosomes

## THE TECHNOLOGY

- Breakthrough
- **Protects and delivers** the most bioavailable form of natural bioactive compounds, ensuring efficient cellular uptake and enhancing activity
- Allows customized approach

## PROVEN EFFICACY

- ***In vivo* proof of concept**: significant superiority vs standard fruit extract
- **Outstanding *in vivo* results** with significance vs T0 and placebo on key aging markers (wrinkle, elasticity, firmness, plumping,...)

## UNIQUE PROCESS & SOLUTIONS

- Exolab Italia trustful expert partner, >20 years' experience in the field of Exosomes, from pharma business
- Plant-derived exosomes, with unique "**synergy system**" of fruits
- State of the art **visualization** of exosomes with special microscopes
- **One billion** plant-derived exosomes in a single application
- Proven mode of action: **secondary metabolites & miRNAS**
- **Skin longevity**: 9 hallmarks of ageing tackled based on proteins modulated with EXOVIVE™ LIFT *in vivo*
- **Stable powder** form, low use level
- Easy to formulate, clear solution

## SUSTAINABILITY

**100% Natural & sustainable**: responsible sourcing, only physical processes, no solvent, low CFP



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# Concepts & Line-up



**EXOVIVE™ LIFT** brings possibilities to connect with brands from different market spaces.

Here we land two different propositions for the same ingredient.




EXOSYNC
Syncing skin cells
for deep regeneration

## Is it possible to speak the native language of youthful skin? Exosome science says yes.

The skin is a living network of cells, constantly communicating through microscopic messengers called exosomes. When cells stop talking, skin begins to age. Aging, at its core, is a communication breakdown. When cells stop talking, skin begins to age. But this dialogue can be restored.

Intercellular communication within plants happens in the same way. Powered by the innovative **EXOVIVE™ LIFT**, the **EXOSYNC** line combines cutting-edge dermo-medical science with dsm-firmenich's expertise in decoding the intelligence of nature.

Plant-derived exosomes - pure actives condensed in a cell-like membrane that penetrates easily - mirror the skin's own communication system to reactivate cellular dialogue, delivering the performance of professional treatments in your daily routine.

The result? Visible skin renewal and a more youthful, sculpted look. Or, in other words: the future of natural skincare science.



EXOSYNC Syncing skin cells for deep regeneration

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# EXOSYNC

Syncing skin cells
for deep regeneration




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# EXOSYNC

with **EXOVIVE™ LIFT**

Syncing skin cells
for deep regeneration

**Reverses 8 years of wrinkles**

**Up to +30% skin's elasticity**

**+90% Collagen I boost**




## Pearl Serum

Pearl Serum is a luxurious concentrate that enhances skin elasticity and firmness. Infused with EXOVIVE™ LIFT and the collagen-boosting duo SYN®-COLL CB and ETERWELL™ YOUTH, it delivers powerful anti-aging benefits. Luminous pearls release potent actives upon application, restoring skin's youthful bounce and vitality.

dsm-firmenich

# EXOSYNC

with **EXOVIVE™ LIFT**

Syncing skin cells
for deep regeneration

**Reverses 8 years of wrinkles**

**Up to +30% skin's elasticity**

**+90% Collagen I boost**




## Pearl Serum

SK-E-102856-31

**Ingredients:** AQUA, ALGIN, GLYCERIN, PENTYLENE GLYCOL, **SYN®-COLL CB (1%)**, **ETERWELL™ YOUTH (1%)**, C13-14 ALKANE, POLYGLYCERYL-6 CAPRYLATE, POLYGLYCERYL-4 CAPRATE, POLYACRYLATE CROSSPOLYMER-6, CAPRYLYL GLYCOL, BIS-POLYCITRONELLYL SUCCINATE, SODIUM PHYTATE, UNDECANE, MICA, **PINK BLOSSOM P02R418 (0.05%)**, **EXOVIVE™ LIFT (0.026%)**, IRON TITANIUM OXIDE, SILICA, CI 77891, TIN OXIDE

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## Marshmallow Cream

A sensorially rich, nutritive skincare cream that melts effortlessly into the skin for a soft, velvety finish. Infused with EXOVIVE™ LIFT, a powerful exosome complex and with a blend of HYA-ACT™ XS, STIMU-TEX® AS and Niacinamide PC to protect the skin. It visibly enhances skin elasticity and firmness. This luxurious formula delivers both indulgent texture and transformative results for a radiant and smoothed complexion.

98.47% natural origin content

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## Marshmallow Cream

SK-E-102649-23

**Ingredients:** AQUA, PROPANEDIOL, MACADAMIA INTEGRIFOLIA/TETRAPHYLLA SEED OIL, ORYZA SATIVA BRAN OIL, BUTYLENE GLYCOL, GLYCERYL BEHENATE, **Niacinamide PC (3%)**, POLYGLYCERYL-6 DISTEARATE, CANDELILLA/JOJOBA/RICE BRAN POLYGLYCERYL-3 ESTERS, JOJOBA ESTERS, **ARGAN OIL (1%)**, **STIMU-TEX® AS (1%)**, POTATO STARCH MODIFIED, ACACIA DECURRENS FLOWER CERA, **Mixed Tocopherols 95 (0.5%)**, **HYA-ACT™ XS (0.5%)**, CAPRYLYL GLYCOL, GLYCERYL CAPRYLATE/CAPRATE, CETYL HYDROXYETHYLCELLULOSE, **PINK BLOSSOM P02R418 (0.3%)**, **EXOVIVE™ LIFT (0.026%)**, GLYCERIN, POLYGLYCERIN-3, CITRIC ACID, HELIANTHUS ANNUUS SEED CERA

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## Day Care Cream SPF 30

Day Care Cream SPF 30 is a high-performance daily moisturizer designed to protect the skin with a high eco-profile scire. It features EXOVIVE™ LIFT, and its exosome technology that enhances skin firmness and elasticity and a modern PARSOL® UV-filter system that efficient sun protection. Also enriched with the natural biotech duo REGU®-AGE CB and PEPHA®-CTIVE CB, delivering visible smoothness and radiance, making it an ideal choice for new generation natural science.

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## Day Care Cream SPF 30

SK-E-102807-14

**Ingredients:** AQUA, DICAPRYLYL CARBONATE, **PARSOL® DHHB (6%)**, C12-15 ALKYL BENZOATE, ISOPROPYL LAUROYL SARCOSINATE, PROPANEDIOL, **PARSOL® EHT (5%)**, **PARSOL® Shield (2%)**, **PEPHA®-CTIVE CB (2%)**, **REGU®-AGE CB (2%)**, POLYGLYCERYL-10 STEARATE, **VALVANCE® *Touch* 210 (1%)**, BEHENYL ALCOHOL, CAPRYLYL GLYCOL, **PINK BLOSSOM P02R418 (0.5%)**, XANTHAN GUM, GLYCERYL CAPRYLATE, MICA, CITRIC ACID, CI 77891, **EXOVIVE™ LIFT (0.026%)**, CI 77491, TOCOPHEROL

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## PINK BLOSSOM P02R418

*Premium olfactive experience.*
*Youth quintessence captured in a fragrance*

Floral notes are giving **vibrancy & elegance to the fragrance**, while **AMBROX®** captive with unparalleled depth, exudes a **timeless natural sensuality.**

powered with emoti**boost®** accord,
**neuroscientifically proven** to make you **feel confident**.

top: red fruits pear peach
mid: rose muguet violet
fond: musky vanilla powdery



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EXSSENCE
The quintessence of nature.
The code of renewal.
dsm-firmenich



# EXSSENCE

The quintessence of nature.
The code of renewal.

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# EXSSENCE

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## What if nature could speak directly to your skin?

Exosome science says yes. The skin is a living network of cells, constantly communicating through microscopic messengers called exosomes Aging, at its core, is a communication breakdown. When cells stop talking, skin begins to age. But this dialogue can be restored.

Intercellular communication within plants happens in the same way. Powered by the innovative **EXOVIVE™ LIFT**, the Exssence line captures the quintessence of nature to resume skin cells communication. Carefully sourced from organic natural origins, plant-derived exosomes are preserved at full potency through dsm-firmenich's sustainable patented extraction process. Like perfectly crafted puzzle pieces, they integrate harmoniously with your skin's own communication system, reactivating the cellular communication and supporting natural regeneration.

The result? Skin that glows with vitality, sculpted and youthful. The pinnacle of natural skincare science.

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98.47% natural origin content




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99,56% natural origin content




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# We bring progress to life.

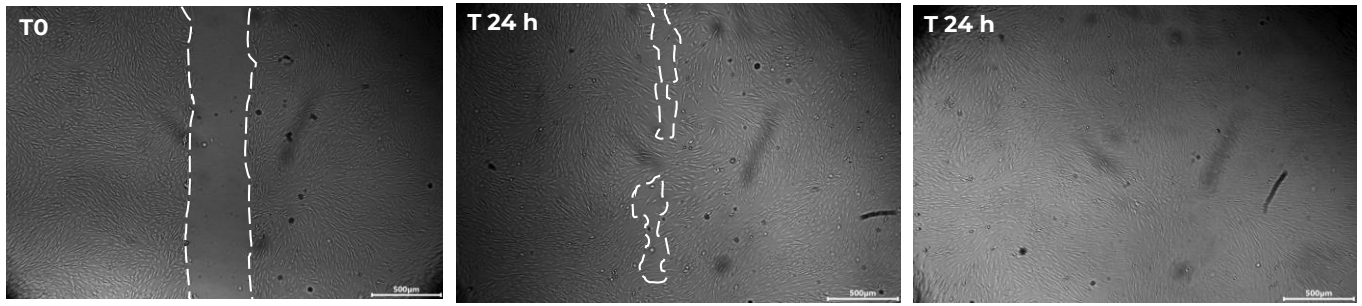
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# EXOVIVE™ LIFT: synergetic blend of fruits

## Unique synergy system

Evidence on collagen assay and scratch test blend of Apple, Mandarin and Papaya, unique combination of actives and miRNAs working together and increasing their potential benefits for enhanced biological activity

**Scratch test:** Wound healing *in vitro* assay on Normal human fibroblasts




Untreated control | Untreated control | EXOVIVE™ LIFT

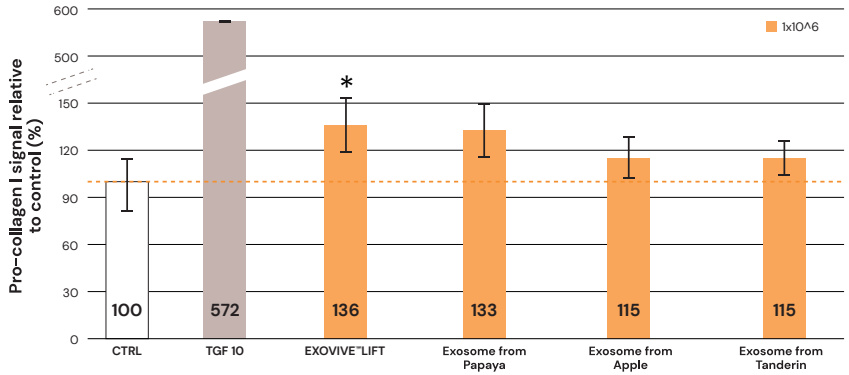
Measurement after 24 and 48 hours with 10^6 vesicles/ml

| Sample 10^6 exosomes/ml | Closure 24h |
|---|---|
| Control | 63.8% |
| Apple | 70.8% |
| Tangerine | 75.1% |
| Papaya | 67.6% |
| **EXOVIVE™ LIFT** | **83.1%** |

**Almost 2 times faster with EXOVIVE™ LIFT compared to single fruit exosome fraction**

**Collagen Assay:** *In vitro* assay on normal human fibroblasts

**Pro-collagen I production** (R92_Collagen I Assay [n=3])




**EXOVIVE™ LIFT significantly stimulates Pro-collagen I at the tested concentrations, whereas the individual Exosome formulations exhibit only minor or negligible effects on Pro-collagen I induction**

Un-paired t-test *p<0.05, **p<0.001



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# Plant-Derived Extracellular Vesicles from organic farming

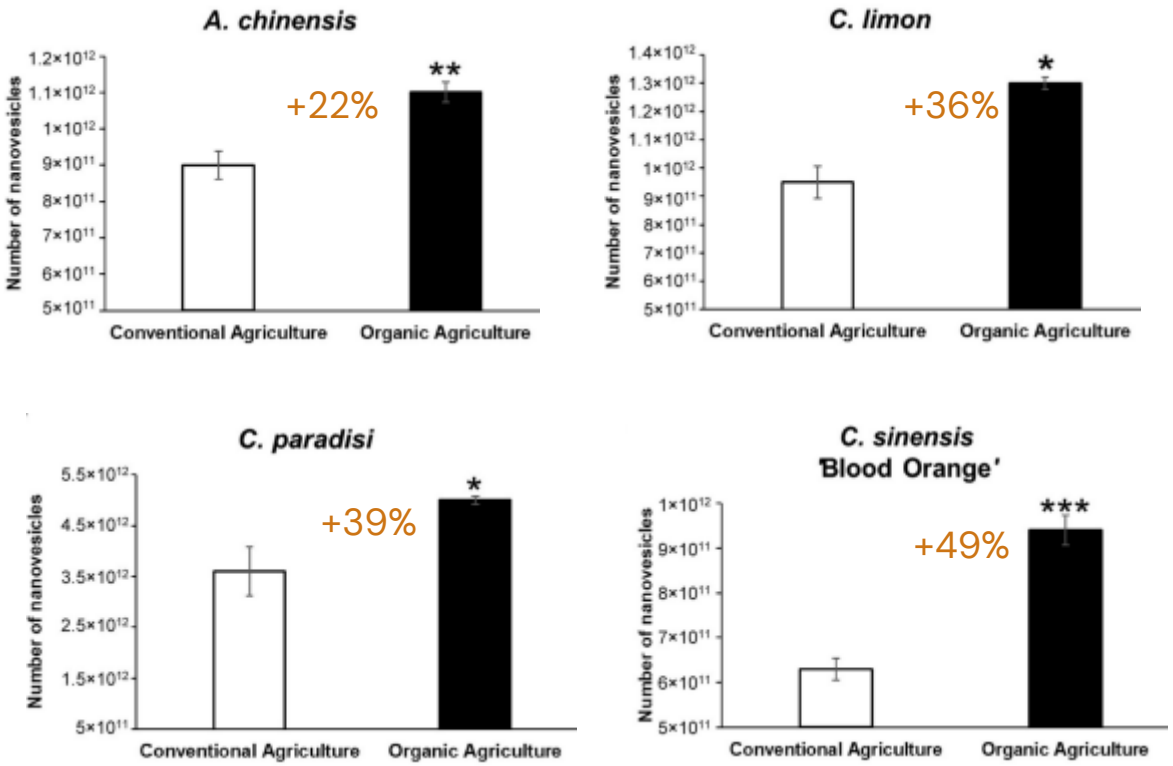
## Higher number of vesicles and slightly smaller size of vesicles vs conventional farming

Testing on 4 different fruits: kiwi, lemon, grapefruit and blood orange

| Fruit | Type of Agriculture | Number of Nanovesicles | Mean (nm) |
|---|---|---|---|
| *A. chinensis* | Conventional Agriculture | $9.0 \times 10^{11} \pm 3.9 \times 10^{10}$ | $166.4 \pm 3.9$ |
| | Organic Agriculture | $1.1 \times 10^{12} \pm 2.7 \times 10^{10}$ | $161.6 \pm 0.6$ |
| *C. limon* | Conventional Agriculture | $9.5 \times 10^{11} \pm 5.7 \times 10^{10}$ | $210.0 \pm 2.5$ |
| | Organic Agriculture | $1.3 \times 10^{12} \pm 2.3 \times 10^{10}$ | $193.5 \pm 2.2$ |
| *C. paradisi* | Conventional Agriculture | $3.6 \times 10^{12} \pm 4.8 \times 10^{10}$ | $198.9 \pm 3.7$ |
| | Organic Agriculture | $5.0 \times 10^{12} \pm 7.8 \times 10^{10}$ | $147.7 \pm 2.4$ |
| *C. sinensis* | Conventional Agriculture | $6.3 \times 10^{11} \pm 2.4 \times 10^{10}$ | $201.7 \pm 5.6$ |
| | Organic Agriculture | $9.4 \times 10^{11} \pm 3.3 \times 10^{10}$ | $178.8 \pm 4.3$ |

Data are expressed as the mean ± SE.

In addition, the Total Antioxidant Capacity has been measured and was also significantly higher in the organic farming-derived vesicles:
+11% Kiwi, + 7% Lemon, +21% Grapefruit and +6% Blood orange




Quantification of conventional and organic farming-derived extracellular vesicles by NTA
* p<0.05, ** p<0.001, *** p<0.0001

Source: Logozzi M. et al. , Nanovesicles from organic agriculture-derived fruits and vegetables: characterization and functional antioxidant content, Int. j. Mol. Sci,, 2021, 22, 8170



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# Connection of clinical efficacy with coherent molecular mode of action

This integrative analysis links the clinical wrinkle-reducing effects of EXOVIVE™ LIFT with :

- molecular alterations identified through within-subject proteomics and
- the miRNA cargo of plant-derived exosomes.

By correlating protein fold changes with each participant's degree of improvement, we identified molecular programs that shift preferentially in individuals exhibiting stronger clinical responses.

To investigate whether plant miRNAs could plausibly contribute to these improvement-aligned molecular patterns, we compared the seed regions of human miRNAs regulating key proteins with those of miRNAs present in apple, papaya, and tangerine exosomes.

Multiple seed matches were identified, supporting a sequence-based mechanistic link between the miRNA cargo of EXOVIVE™ LIFT and the molecular changes associated with reduced wrinkle depth.



# Role of miRNA

## Importance of the seed region

miRNA is a small RNA (RiboNucleic Acid) molecule found in cells:

- Non-coding RNA (doesn't make protein itself)
- Acts like a control dimmer switch that helps decide how much protein a gene should make
- miRNA binds to messenger RNA (mRNA - genes make protein by first making mRNA), this binding reduces protein production
- miRNA is made of a sequence of about 22 nucleotides (from 4 nucleobases: Adenine, Guanine, Cytosine and Uracil)

The seed region is the critical part that determines which mRNA it binds to.

Corresponds to nucleotides 2-7 (or 2-8)

It determines the target specificity

Small changes in the seed region can completely change which genes are regulated.




miRNA seed region binding to mRNA

Example of human miRNA 4434:

hsa-miR-4434: A**GGAGAAG**UAAAGUAGAA

**Seed region**



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# Exosomes: overview on competition

## Differentiators

- Genuine exosome (no liposome, no biomimetic exosome)
- Purification of exosome (no particulate matter, number of exosomes clearly mentioned)
- From organic fruit or plant (no stem cell)
- Unique fruit composition
- Cosmos approved (on going)
- Sustainable extraction, only physical processes, no solvent, low CFP
- Powder form, more stable, longer shelf life
- In vitro data at low concentration
- Clinical study showing significant superiority vs corresponding standard juice extract
- Significant and dose dependent skin benefits on main longevity markers: elasticity, firmness, wrinkles vs To and vs Placebo

# New capability: **Actives and fragrances encapsulation**

Beautifying cosmetic formulations (featured on Pearl Serum)

**Proprietary encapsulation technology**

- Natural, biodegradable, macroscopic beads (0.3-4mm)
- Easily breakable under deposition without residues, creamy texture
- Encapsulation of cosmetic **actives** AND **fragrance**: high loading (>20%)
- Blooming fragrance performance
- Compatible with surfactant-containing bases
- Cosmetic ingredients encapsulation for improved protection and delivery
- Moisturizing cosmetic benefits
- Support pigments, mica







Scent pearls in shower gel or liquid hand soap, for a skin moisturization and blooming fragrance performance.



Mono Pearl Fragrance: Each pearl contains the right amount of fragrance



Dual moisturizing hand sanitizer: Hydroalcoholic gel + moisturizing perfumed skin pearls for a dual-function product



Monodose skin pearl with or without fragrance, for daily use as face cream



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# EXOVIVE™ LIFT delivers key miRNAs

## Method of analysis

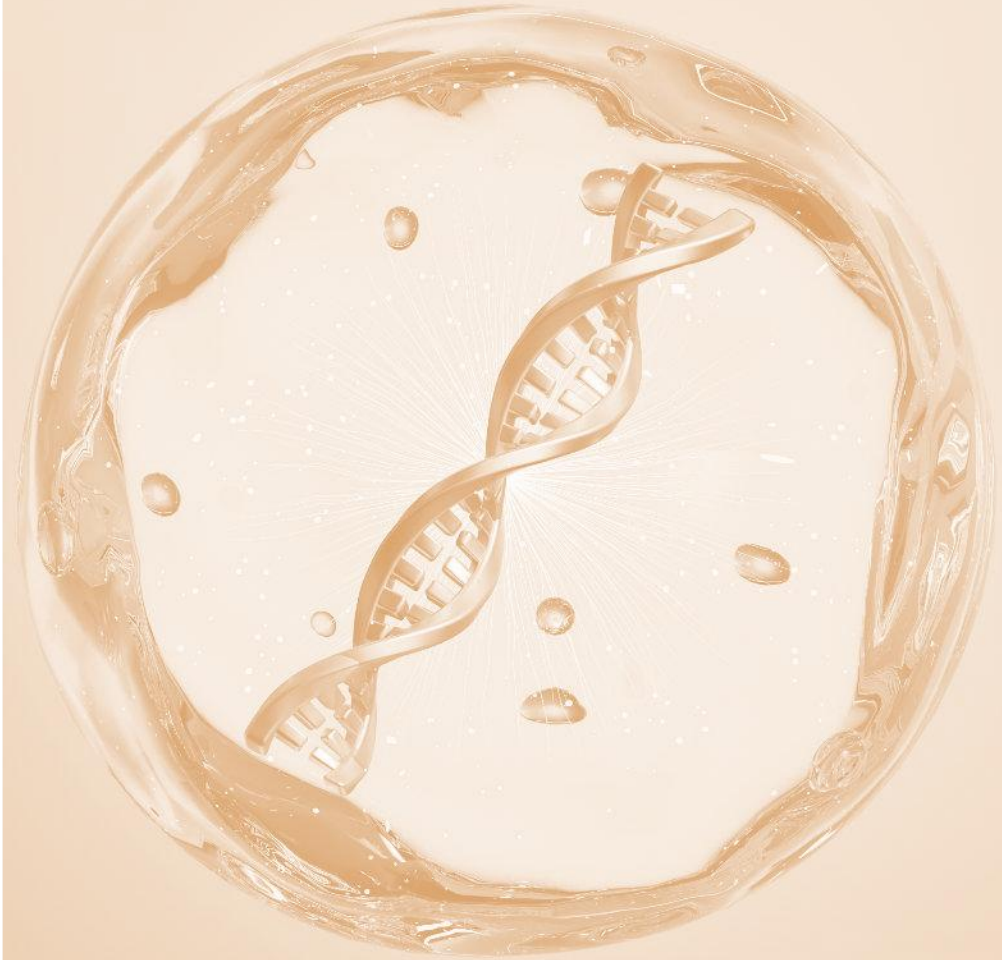
Plant Material and Sampling: Apple (Malus domestica), Tangerine (Citrus reticulata), Papaya (Carica papaya)

Quality control and pre-processing: For each sample (which was analyzed in triplicate), the raw sequencing data was first checked for overall quality. This included checking the read quality values, detecting adapter contamination and checking the alignment rates.

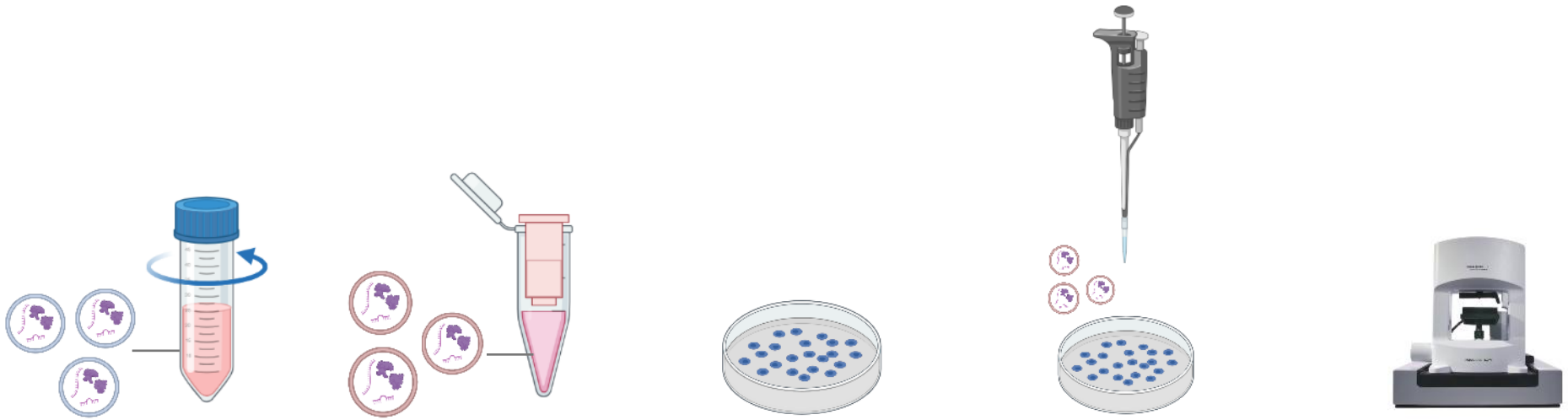
Alignment and mapping: The cleaned reads were aligned to reference miRNA databases using tools such as Bowtie and miRDeep2. This step enabled the accurate identification and quantification of the known miRNAs in each replicate.

Differential expression analysis: The expression levels of miRNAs were compared in the three replicates and between different fruit samples. Statistical tools such as DESeq2 was used to identify significantly differentially expressed miRNAs.

Discovery of novel miRNAs: In addition to profiling known miRNAs, new miRNAs were predicted using miRDeep2.



# Imaging the Uptake of Plant-Derived Exosomes into Cells Using Nanolive Microscope



Pre-label exosomes by Dill dye

Wash out excessive dye

Seed fibroblasts cells

Add pre-labeled and purified exosomes

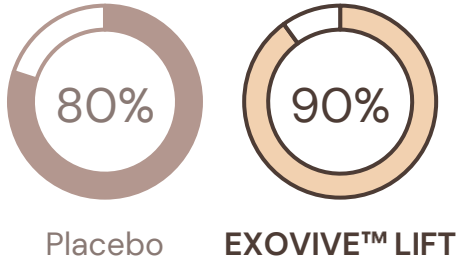
Image acquisition



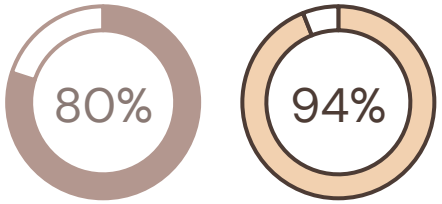
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# EXOVIVE™ LIFT outperforms placebo & convinces the volunteers!

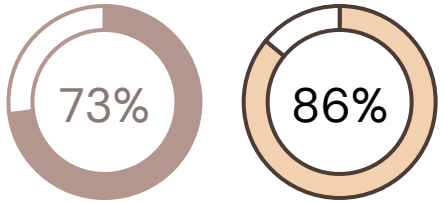
**…overall skin appearance improved**



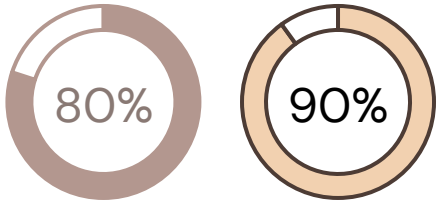

**…my skin feels softer**



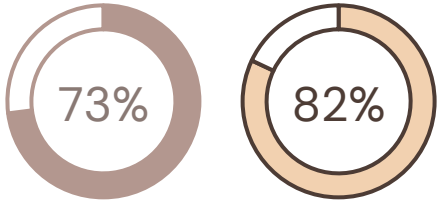

**…my skin feels revitalized**



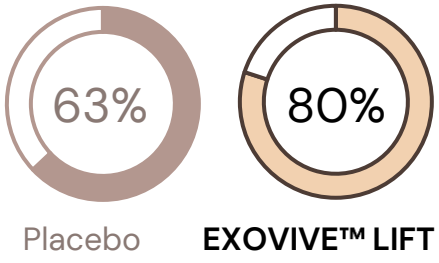

**…my skin feels firmer**




**…wrinkles & fine lines improved**




**…I would use it as part of my cosmetic routine**




By using EXOVIVE™ LIFT at 0.026% for 2 months, 90% of volunteers agree: skin feels softer, firmer and overall skin appearance has improved!