

ACTIVE BEAUTY

GravityTM

Zero-G facial lifting & reshaping



Well-ageing / Matrix restructuration

Givaudan

Human by nature

Focus on the product

Visible signs of ageing and loss of skin structure, the extra toll taken by gravity

The main biomechanical properties of the skin, such as suppleness, firmness, or elasticity, are linked to some key extracellular matrix constituents: collagen, hyaluronic acid, or elastin. More specifically, **elastic fibres are responsible for skin resilience**, its elasticity, and deformation capacity^{1,2}. Those fibres are structured with a central core of elastin, surrounded by microfibrils and glycoproteins (such as fibulin-5).

With skin ageing, one can observe a faster degradation, and a lack of regeneration, of those structural elements. This results in well-known clinical signs of ageing, affecting consumers globally, as 54% of them³ spontaneously declare being affected by one of the following phenomena: sagging skin, lack of skin tonicity and firmness, loss of a well-defined face contour, or even double-chin apparition (with an excess of fat storage).

If several external factors are usually described to aggravate the natural ageing phenomenon (UV exposure, pollution, artificial lights...), **gravity** is often forgotten as its action on the skin is perpetual and constant. However, it significantly **contributes to many signs of ageing**, especially on the lower part of the face, as described by recent research work⁴.

Identifying how to relaunch the production of key structural constituents of the skin, while fighting against the effect of gravity, therefore became an exciting and promising way to reinvent well-ageing!

Follow the oceanic red star!



R&D experts from our Marine Biotechnology Centre of Excellence, based in the pink granite Coast (Brittany, France), identified a red macroalgae (*Gigartina stellata*), rich in various biomarkers (shinorine, floridoside, hordenine, carrageenans...) recognised for their several benefits: antioxidant, UV-protection, hydration or even slimming.

Just like other macroalgae, *Gigartina* grows and produces its metabolites simply by using sunlight and carbon dioxide it captures in the atmosphere. By doing so, it participates in cleaning our environment, making algae one of the most sustainable resources for the beauty industry.

During their biological screenings, Active Beauty researchers discovered that a specific fraction from this algae extract was also able to relaunch the production of key biomarkers, such as collagen I and III or fibulin-5. Thanks to an exclusive multi-step and eco-friendly process, they were then able to craft an enriched extract of *Gigartina stellata*, giving birth to Gravityl™, a unique ingredient carrying the biological activity of this powerful algae.

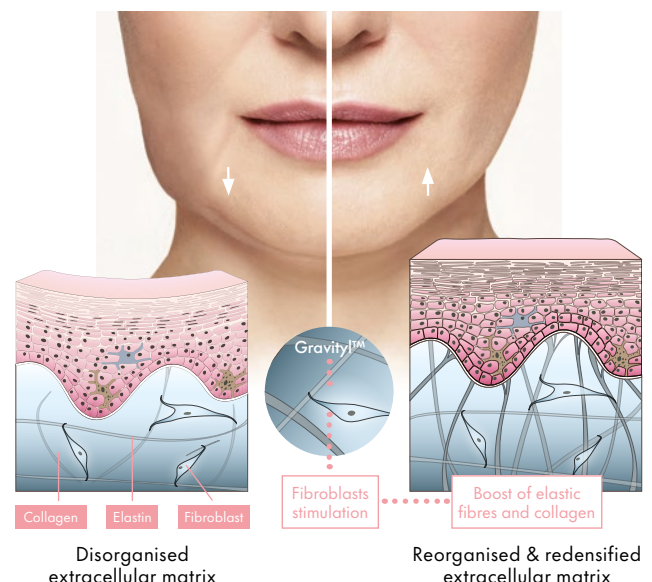
Gravityl™, a powerful lifting effect with a proven activity on the face contour

By relaunching key processes linked to the extracellular matrix and elastic fibres (+61% collagen I), and reorganising fibres in the dermis, Gravityl™ brings back suppleness to the face, with a demonstrated 30 years rejuvenation of the skin biomechanical properties!

Two clinical tests versus placebo, on a total of 84 volunteers, established that Gravityl™ enables to:

- Relaunch the production of collagen fibres in mature skin and increase collagen content 3.4x better than the placebo.
- Improve skin firmness & elasticity by up to 8% (7x more than the placebo).
- Visually reshape & reinforce the structure of facial skin.
- Drastically reduce the double-chin volume in just one month.

Thanks to its specific mode of action and spectacular performances, Gravityl™ is the ideal ally to fight against visible signs of ageing, skin sagging and double-chin!



¹ Kadoya et al, 2005, Dermatopathology; ² Thomson et al, 2019, Seminars in Cell & Developmental Biology; ³ Givaudan internal consumers survey, December 2022, conducted in 10 countries and 4100 consumers, more details available on request; ⁴ Flament F, Bazin R, Piot B., L'Oréal, Influence of gravity upon some facial signs. Int J Cosmet Sci. 2015 Jun;37(3):291-7

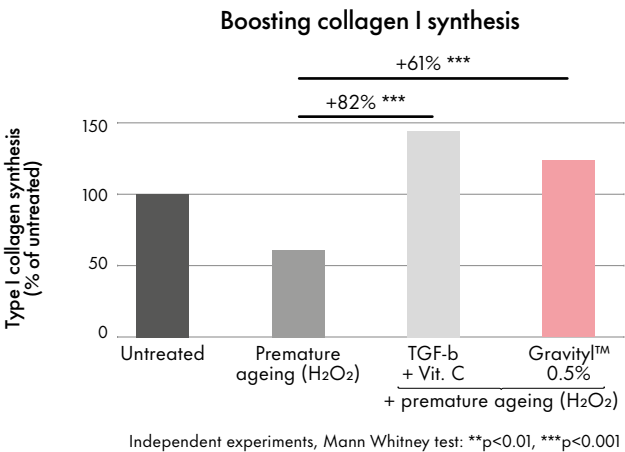
Biological activity

Improvement of dermis structure & skin elasticity

1. Collagen synthesis under oxidative stress (*in vitro*)

Type I collagen synthesis was evaluated on fibroblasts treated or not with 0.5% of GravityTM (48 hours incubation) and under oxidative stress (H₂O₂ for 2 hours) in order to mimic premature ageing, before a new 48 hours incubation after rinsing. Type I collagen was then quantified by ELISA method.

Results: GravityTM significantly **upregulates collagen I production** in premature ageing conditions.



2. Transcriptomic study – focus on skin elasticity (*in vitro*)

A transcriptomic analysis was performed by RT-qPCR, using SYBR[®] Green method, on normal human dermal fibroblasts (NHDF) pre-treated with GravityTM at 0.5% for 18 hours.

Cellular function	Gene names		Fold expression
Elastic fibres organisation	Microfibril associated protein 2	MFAP2	+24%**
	Microfibril associated protein 5	MFAP5	+6%#
	Fibulin 5	FBLN5	+24%#
Extracellular matrix	Collagen type III alpha 1	COL3A1	+33%#
	CD44 molecule	CD44	+58%#
Elastic fibres degradation	Heparanase	HPSE	-40%*

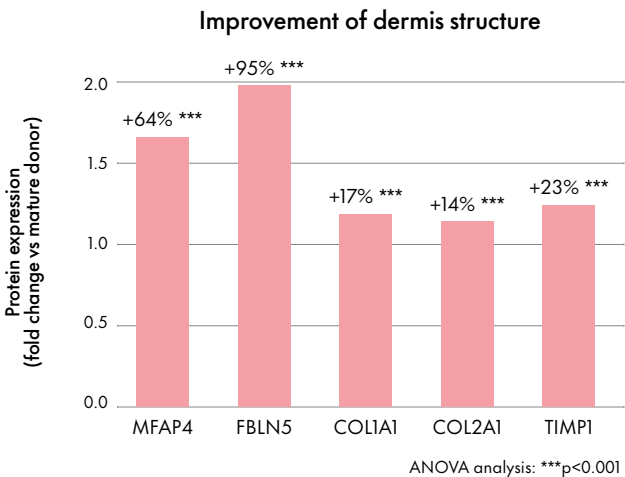
Student's t-test: #p<0.1, *p<0.05, **p<0.01

Results: GravityTM influences the expression of a whole set of **genes involved in the dermis structure, elastic fibres organisation and fibres degradation protection**.

3. Proteome analysis (*ex vivo*)

A full proteome characterisation was performed on skin explants from a young donor (28 years) and a mature donor (59 years), which were topically treated with GravityTM at 1% for 5 days or left untreated.

Results: GravityTM significantly **restores the production of key proteins impacted by skin ageing** (data not shown), and in particular proteins involved in **elastic fibres organisation** (MFAP and fibulin-5) and in the **dermis structure** (collagen I & II, and TIMP1, a MMP inhibitor).



Biological activity

Restoring skin biomechanical properties

1. Reorganisation of the dermis scaffold (Bi-photonic microscopy – ex vivo)

A collagen auto-fluorescence technique was used to determine the organisation of collagen fibres in the dermis, thanks to bi-photonic microscopy and second harmonic generation (SHG).

These measurements were performed on skin explants from a young donor (19 year old) and from a mature donor (49 year old), treated or not with Gravityl™ at 1% for 3 days.

Results: In a young skin, it is possible to observe a multi-directional organisation of the collagen fibres, with multiple orientations, favourable to the general structure of the dermis. With ageing, a preferential orientation can be observed in the collagen fibres, typical of a loss of skin structure.

Gravityl™ significantly **orientates collagen fibres back to a multi-directional organisation**, recovering an optimal structure in the deep layers of the skin.

2. Improvement of skin suppleness (AFM – ex vivo)

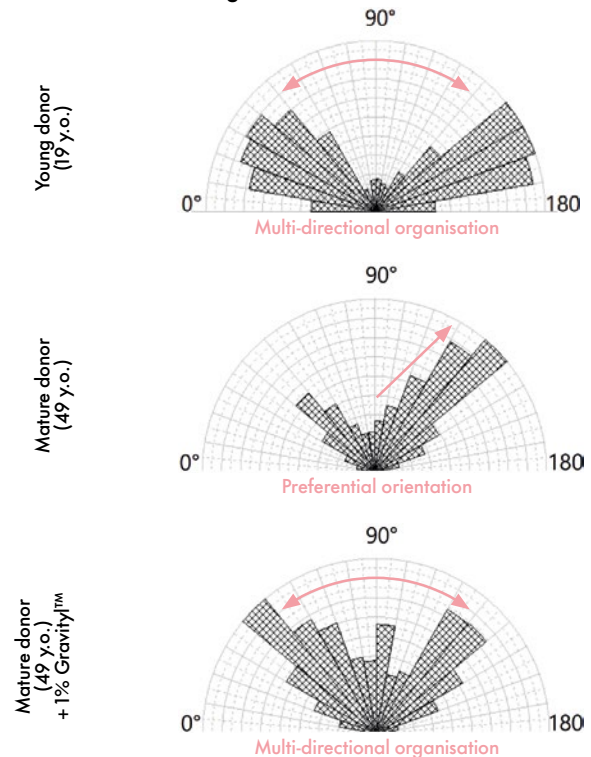
Force measurements were performed on the same explants as in the previous experiment (2 donors from 19 and 49 years old, treated or not with Gravityl™ at 1% for 3 days), using the Atomic Force Microscopy (AFM) coupled to an epifluorescence microscope (for a precise positioning of the AFM probe). The elastic modulus (E_a , related to the suppleness of the *stratum corneum*) was then quantified thanks to BioMeca Analysis® software.

This value of elastic modulus is inversely correlated to the hydration level, as a better hydration will result in a more supple, less stiff, *stratum corneum*.

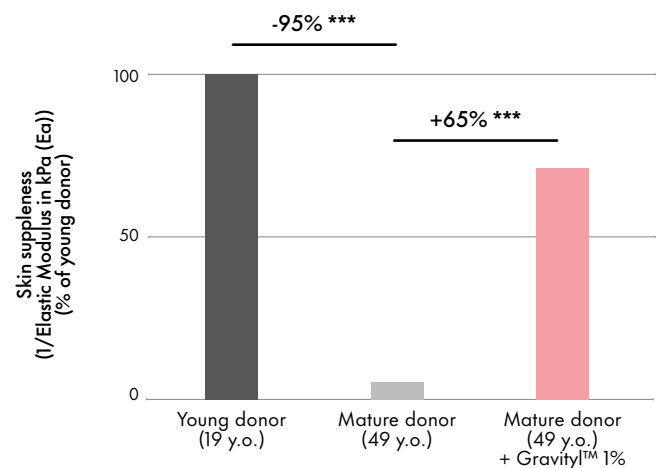
We therefore plotted the inverse of E_a value on the graph beside (normalised to the young donor value), to represent the skin suppleness.

Results: While ageing drastically decreases the suppleness of the skin, Gravityl™ significantly **restores the skin suppleness**, close to the value of a skin 30 years younger.

Reorganisation of the dermis structure



Back to the suppleness of a skin 30 years younger!



Mann-Whitney test: *** $p < 0.001$

Clinical efficacy

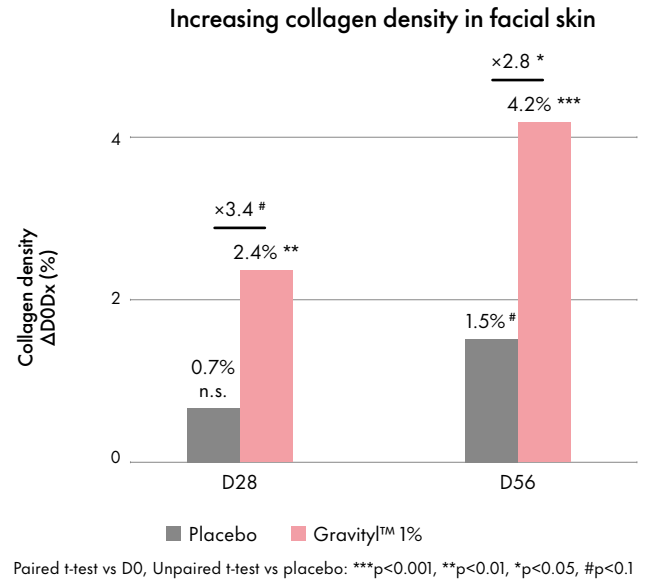
Boosting collagen density and lifting sagging skin (clinical test #1)

A double blind clinical evaluation was carried out on 40 volunteers (women from 55 to 75 years old, with a visible sagging of their lower part of the face), divided into 2 groups. Volunteers applied a cream twice a day either containing Gravityl™ (1%) or the same exact formula without the active as a placebo, for 56 days.

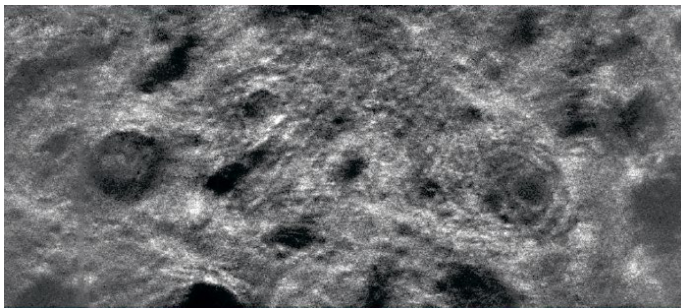
Collagen quantity in their facial skin was determined thanks to SiaScope® and illustrative pictures were obtained by using Line-Field Optical Coherence Tomography (LC-OCT). A visual observation was also realised by suspending a 20g weight to their cheek and monitoring the mechanical deformation resulting from it.

Results: Gravityl™ significantly stimulates collagen density by up to 4.2%, and up to 3.4 times better than the placebo.

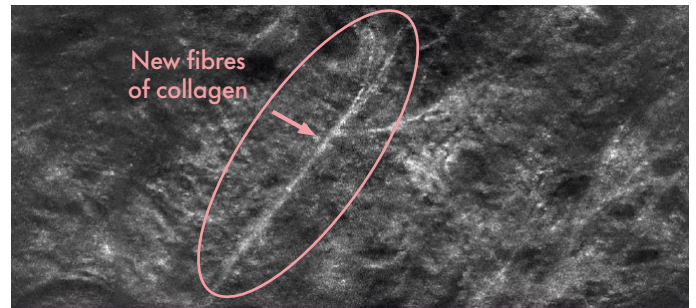
This can be further confirmed thanks to the LC-OCT technique, with the **visualisation of collagen fibres** below the dermo-epidermal junction, which can not be observed after the use of the placebo.



Illustrative pictures generated by LC-OCT of collagen fibres in the skin after 56 days using a placebo (left) or Gravityl™ at 1% (right) (depth: 60 microns below DEJ)



Placebo



Gravityl™ 1%

Macroscopically, this significantly **improves the biomechanical properties of the skin**, as can be noticed from the reshaping & lifting benefits on the volunteers' face after suspending a weight to their cheeks, with a visual **improvement of the face contour and skin firmness**, as well as of the skin texture.

Illustrative pictures of a volunteer using Gravityl™ at 1% for 56 days
Intense reshaping & lifting activity (Vol_GP03, 70 years old)



D0



D28



D56

Clinical efficacy

A reshaping effect to fight against double chin! (clinical study #2)

A double blind clinical evaluation was carried out on 44 volunteers (women from 35 to 57 years old, with a dry skin, wrinkles in the crow's feet area and a chin ptosis), divided into 2 groups. Volunteers applied a cream twice a day either containing Gravityl™ (1%) or the same exact formula without the active as a placebo, for 28 days.

Skin firmness and elasticity were determined by using a cutometer® (parameters R0 and R5), and the double chin volume was evaluated thanks to the AEVA® technology.

1. Improving skin elasticity and firmness

Skin elasticity and firmness were determined using the suction/elongation method thanks to a cutometer®.

The parameters which were followed were R0 and R5 (firmness and net skin elasticity).

R0 (or Uf) is reduced when the skin is firmer (we therefore plot -R0 to show benefits) and R5 (or Ur/Ue) gets to higher values when the skin elasticity is higher.

Results: Gravityl™ significantly improves skin firmness and elasticity after 28 days of use, by respectively +7.0% and +8.0%, up to 7 times better than the placebo.

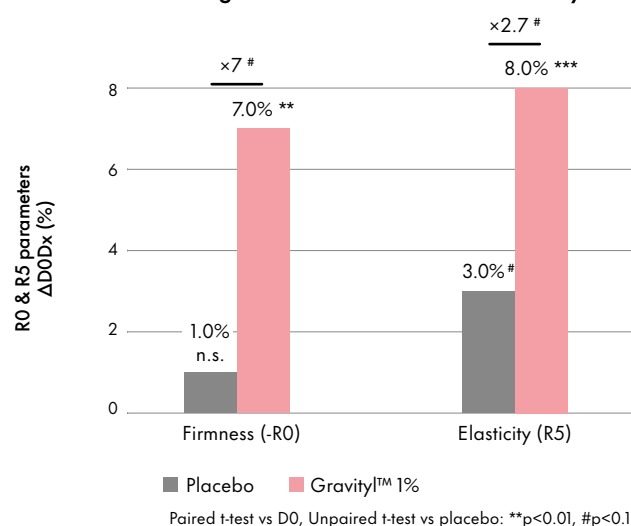
2. Significant lifting effect on the chin in just 1 month

The volume of volunteers' double chin was evaluated at D0 and after 28 days of study by using the AEVA-HE® technology.

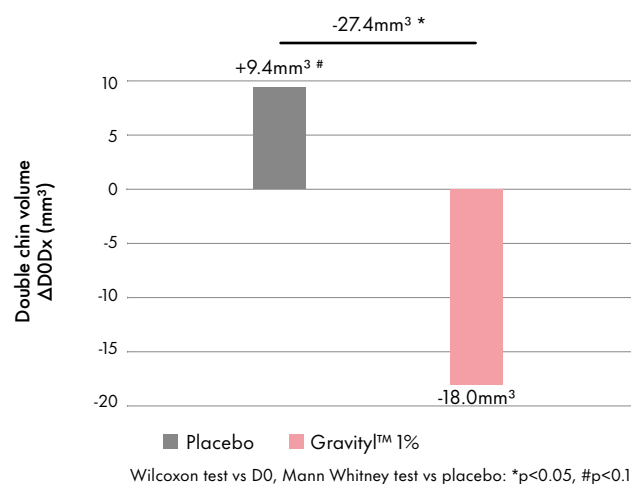
Results: Gravityl™ significantly decreases the volume of the double chin versus placebo, by -27.4mm³ in average on the whole panel of volunteers.

This represents a visual improvement of volunteers' facial contour, and a drastic aesthetic benefit for the lower part of their face, as one can observe directly on the illustrative pictures displayed on the next page.

Lifting effect on facial skin after 28 days

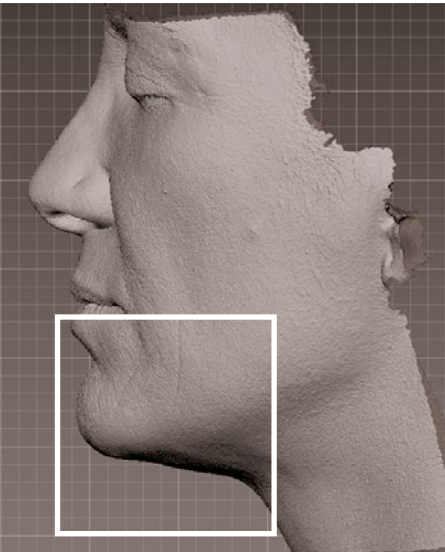


Drastic reduction of the double chin in just 1 month

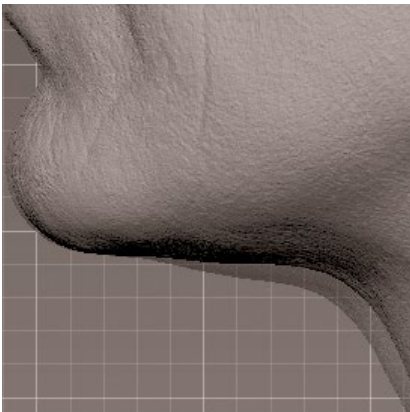


Clinical efficacy

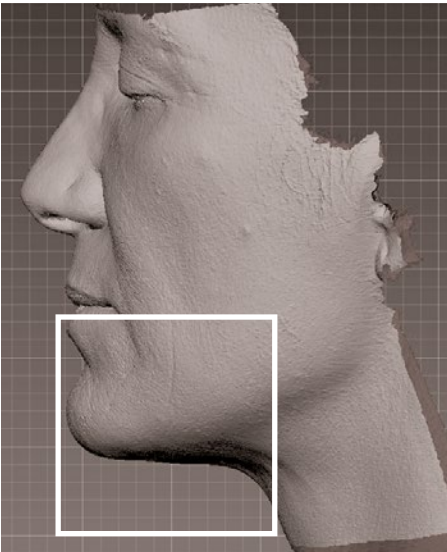
Illustrative AEVA-HE® pictures of a volunteer using Gravityl™ at 1% for 28 days
Drastic reduction of the double chin (Vol_21, 44 years old)



D0



Overlay D28/D0

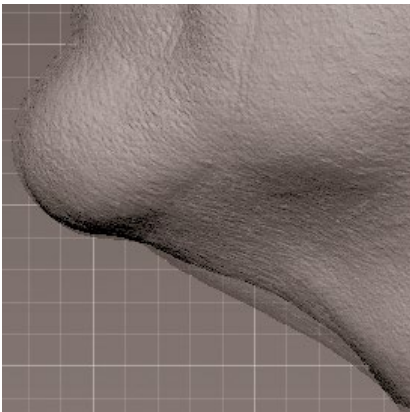


D28

Illustrative AEVA-HE® pictures of a volunteer using Gravityl™ at 1% for 28 day
Drastic reduction of the double chin (Vol_25, 50 years old)



D0



Overlay D28/D0



D28

Summary



Technical information

INCI:	Water (and) Propanediol (and) Gigartina Stellata Extract
Origin:	Blue biotechnology
Preservation:	None
Appearance:	Pale yellow liquid
Solubility:	Water soluble
Dosage:	1%
Processing:	Can be added at the end of the formulation process, at a temperature below 40°C, and a pH between 2 and 10.

Claims

Claims:	Facial contour improvement, skin sagging reduction, extracellular matrix protection, skin firmness improvement, skin biomechanical properties enhancement, collagen booster, dermis scaffold reorganisation, skin lifting, skin tonicity improvement, double chin reduction, facial oval correction, jawline redefinition.
Applications:	Anti-ageing serum, well-ageing cream, facial contour reshaper, surgery-free lifting, anti-ageing night cream, jawline corrector.

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Givaudan

Human by nature

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