
DETOXONDRIA
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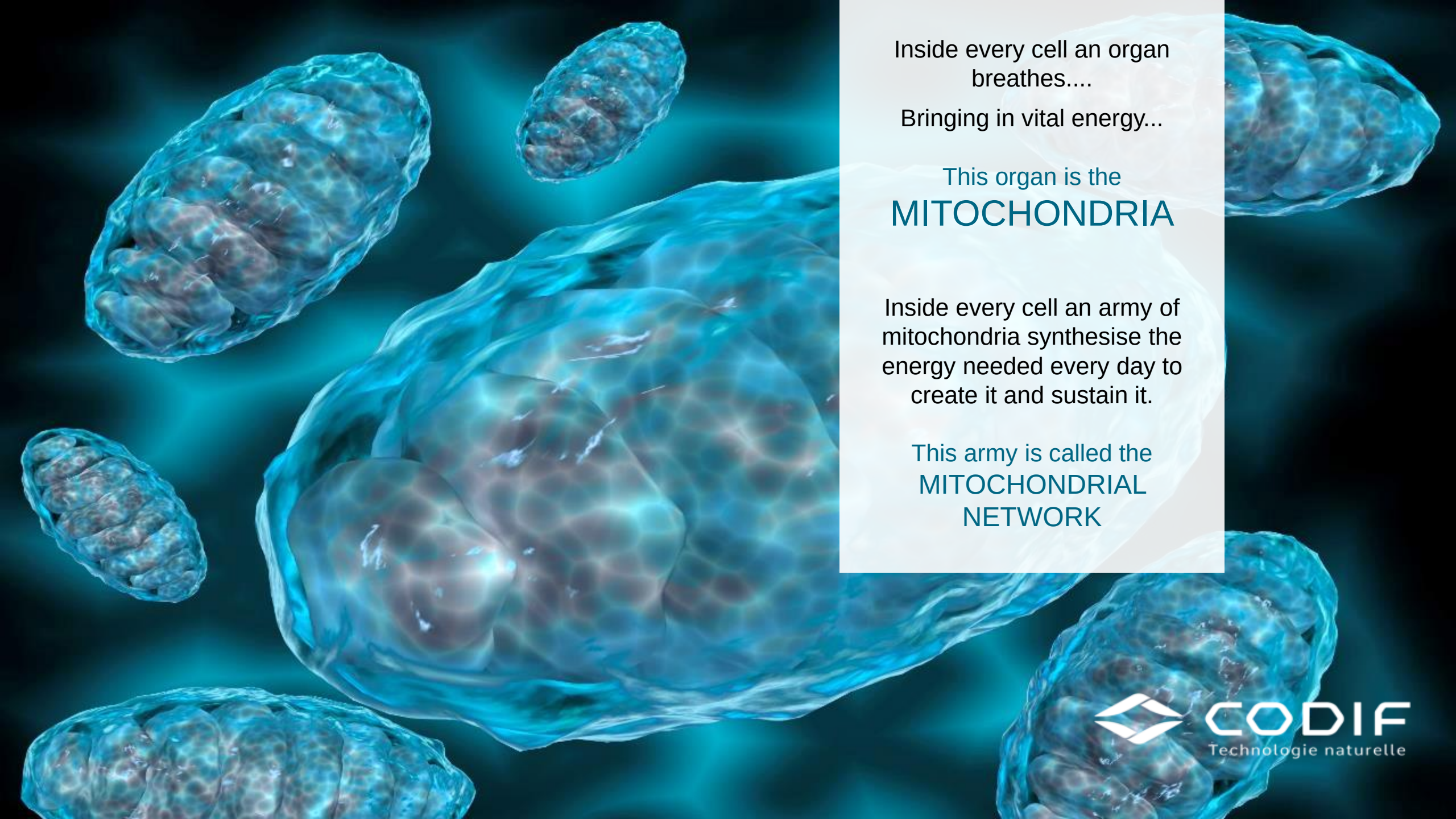
Technologie naturelle



Inside every cell an organ breathes....

Bringing in vital energy...

This organ is the

MITOCHONDRIA

Inside every cell an army of mitochondria synthesise the energy needed every day to create it and sustain it.

This army is called the

MITOCHONDRIAL NETWORK

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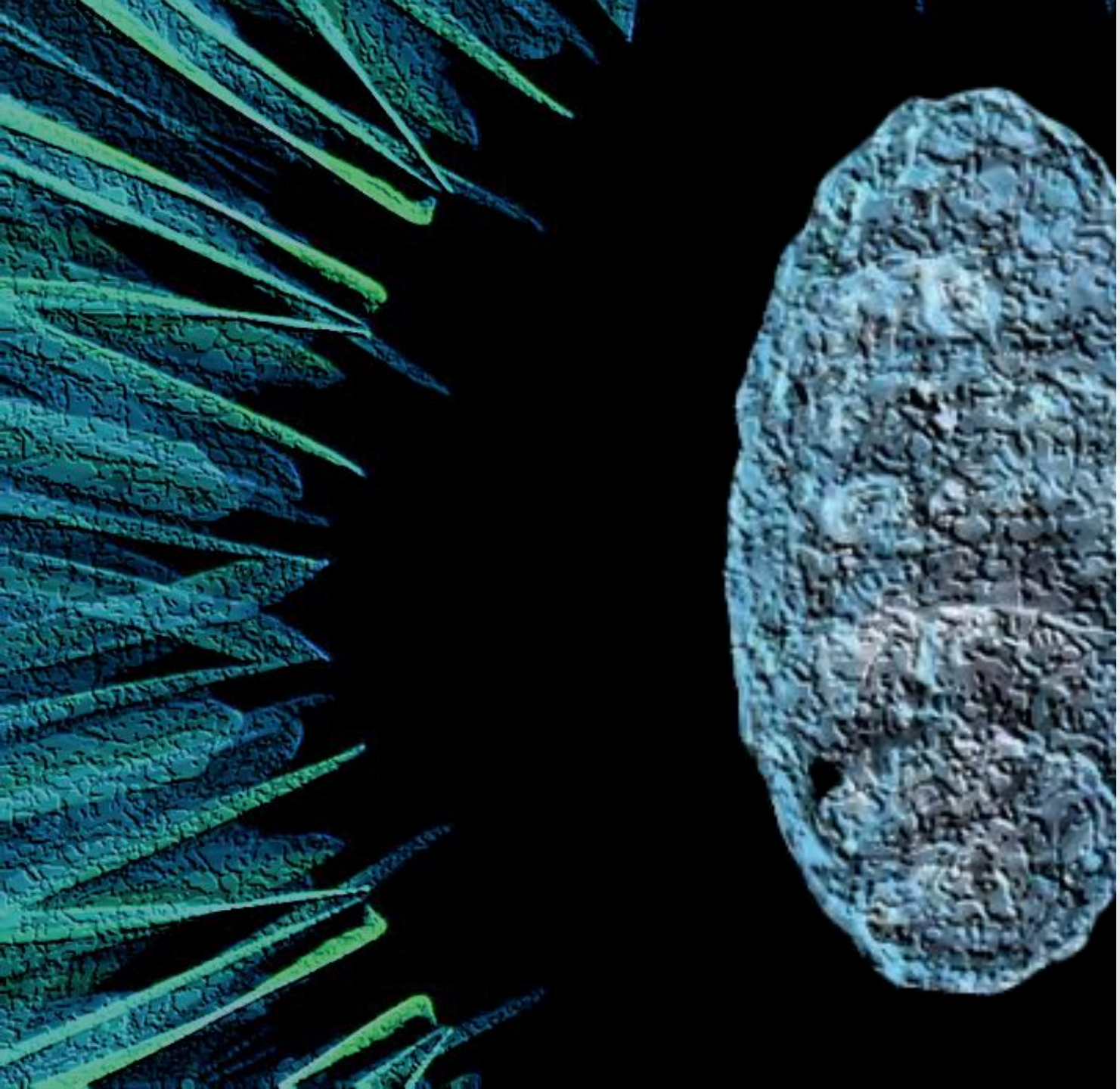
The vitality, functioning and also ageing of cells depends on mitochondrial homoeostasis.

Codif TN Laboratories have never ceased studying the central role of the mitochondria in cutaneous cells.

Our work has led to
4 publications
4 posters
1 Innovation Prize

The background photo shows a culture of human dermal fibroblasts. Cell nuclei marked in blue; mitochondria marked in red.



But every day, mitochondrial homoeostasis is threatened.

Respiration generates toxic free radicals which damage the component parts of the mitochondria.

This generates waste which builds up and interferes with the functioning of this vital organ, endangering the life of the cell itself.

When the accumulation of damage to the mitochondria reaches the point of no return, the cell initiates a survival reflex to recycle the damaged mitochondria:

MITOPHAGY.

MITOPHAGY.

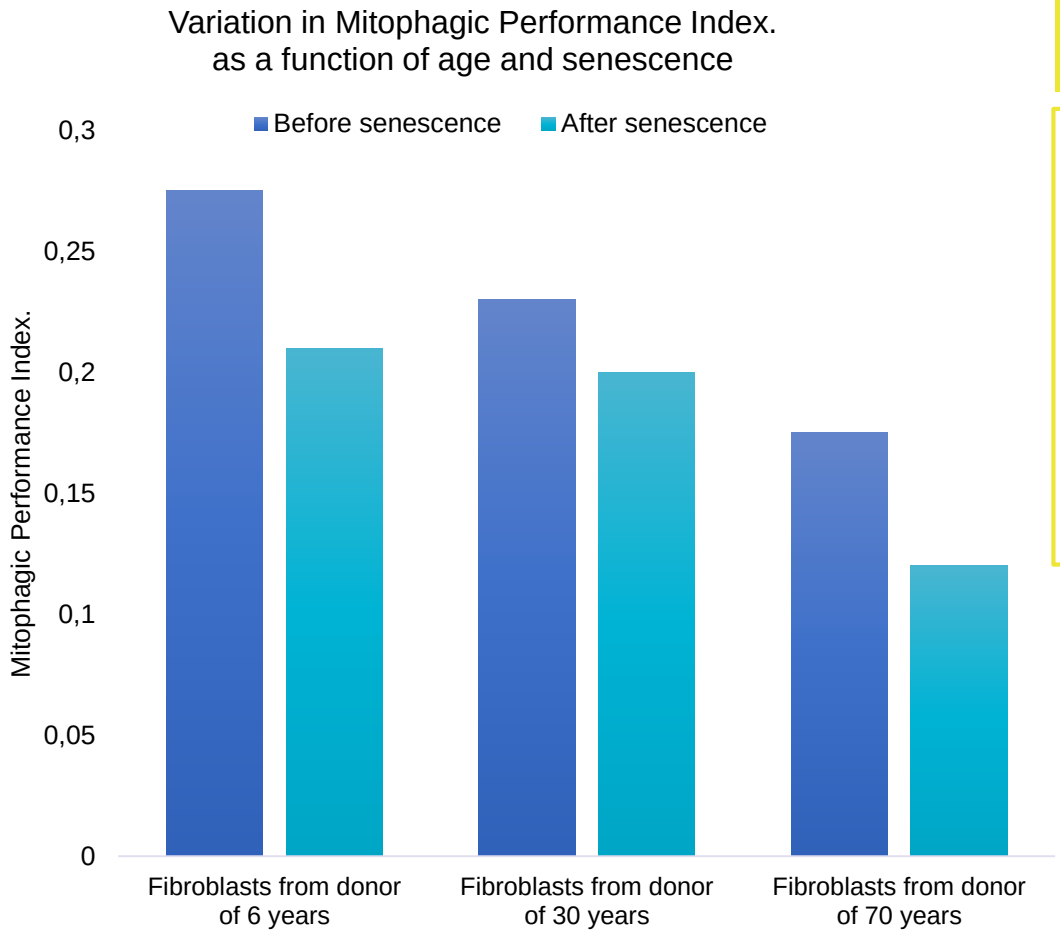
As they lose the ability to activate mitophagy, cells accumulate non-functional mitochondria and enter a senescent phase.

A decrease in mitophagy performance can therefore be used to indicate cellular senescence.

CODIF LABORATORIES HAS DEFINED
A MITOPHAGIC PERFORMANCE INDEX

The calculation is based on an analysis of 3 markers for cellular senescence.

$$\left\{ \frac{\text{mitochondrial mass / autophagy}}{\text{cellular size}} \times 1000 \right\}$$



CODIF TN STUDY

PROTOCOL
Dermal human fibroblasts from donors of different ages. Senescence induced by multiplication of ageing cycles. Analysis of senescence markers by flux cytometry.

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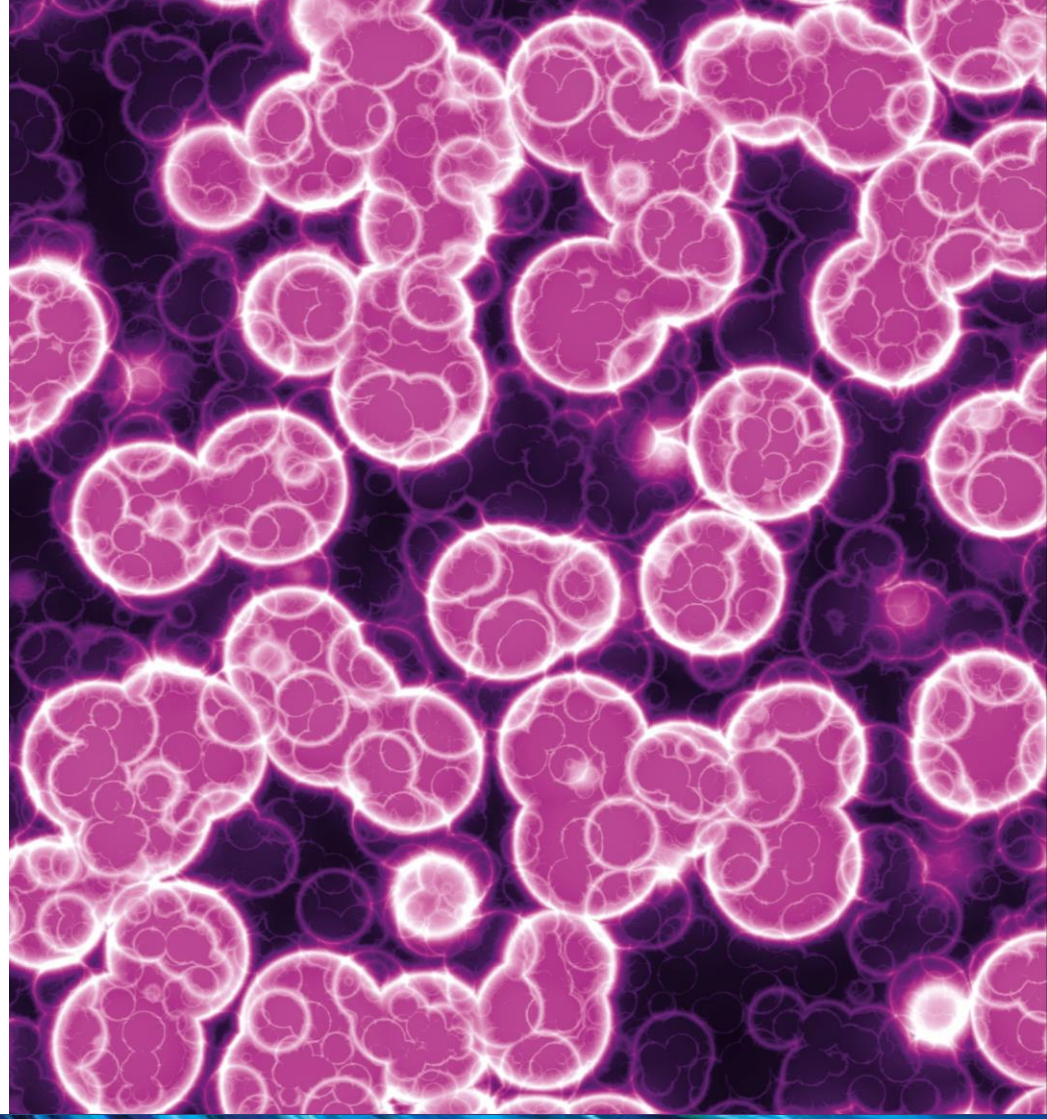
What is the solution to combating cellular senescence?

To address the problems of cellular senescence, we have developed a biotechnology extract from Rhodella violacea.

Isolated in 1951 by Kornmann in Germany, this purple-red microalgae has a very high resistance to oxidative stress thanks to a pool of catalases and peroxidases.

Through this enzymatic pool, it is able to recycle H2O2 and to drop very rapidly the concentration of this highly oxidizing compound in the environment where it evolves. Its resistance to oxidative stress is also manifested by the secretion of a unique exopolysaccharide that forms a protective mucilage around the cells..



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WHAT IS THE SOLUTION TO COMBATING CELLULAR SENESCENCE?

Detoxondria

In order to stimulate its ability to resist stress, we cultivate Rhodella in photobioreactors 500 - 700 litres in size where it is repeatedly exposed to severe oxidative stress using hydrogen peroxide.

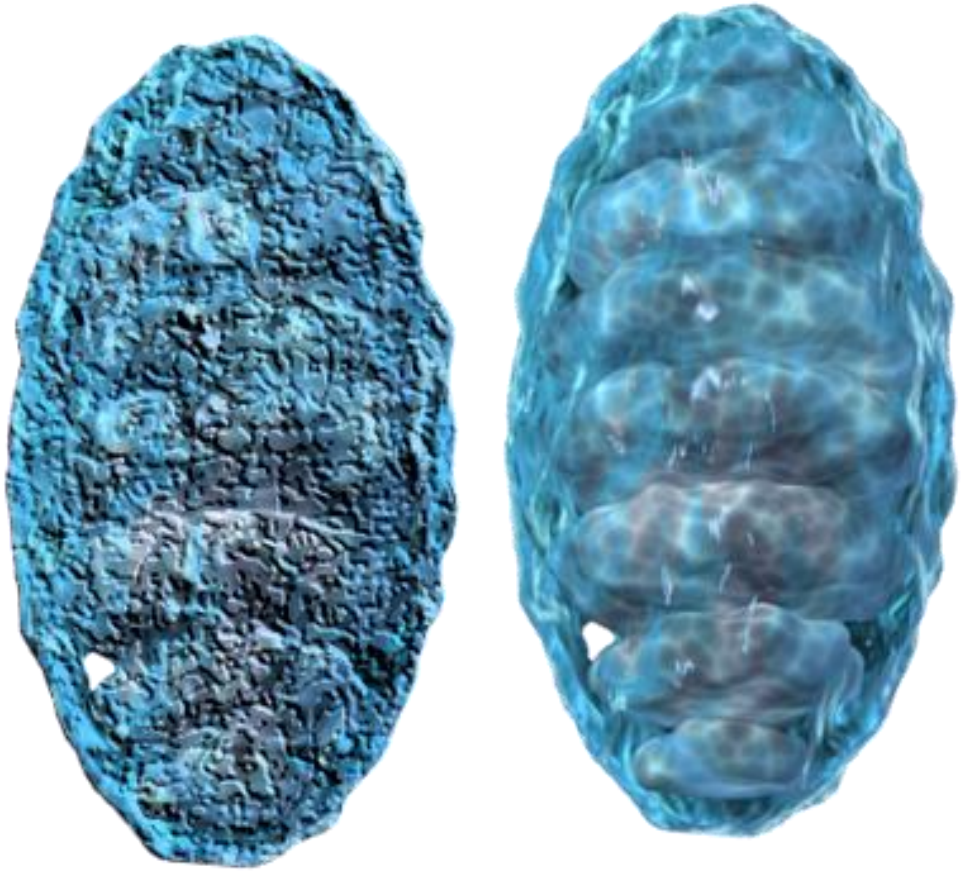
In addition to stimulating its intra-cellular defences, Rhodella reacts by producing its protective exopolysaccharide.

We then use special concentration methods to produce concentrate of exopolysaccharides and intracellular enzymes: Detoxondria

The whole culture is valued and therefore produces no waste.

WHAT IS THE SOLUTION TO COMBATING CELLULAR SENESCENCE?

Detoxondria



MECHANISM

1 - Activation of mitochondrial detoxification processes.

2 - Improvement of mitochondrial network.

3 - Improvement of Mitophagic Performance Index.

WITH BENEFITS FOR

Oxygenation of the skin.

Susceptibility of the skin to fatigue.

Luminosity of the skin tone.

Signs of fatigue.

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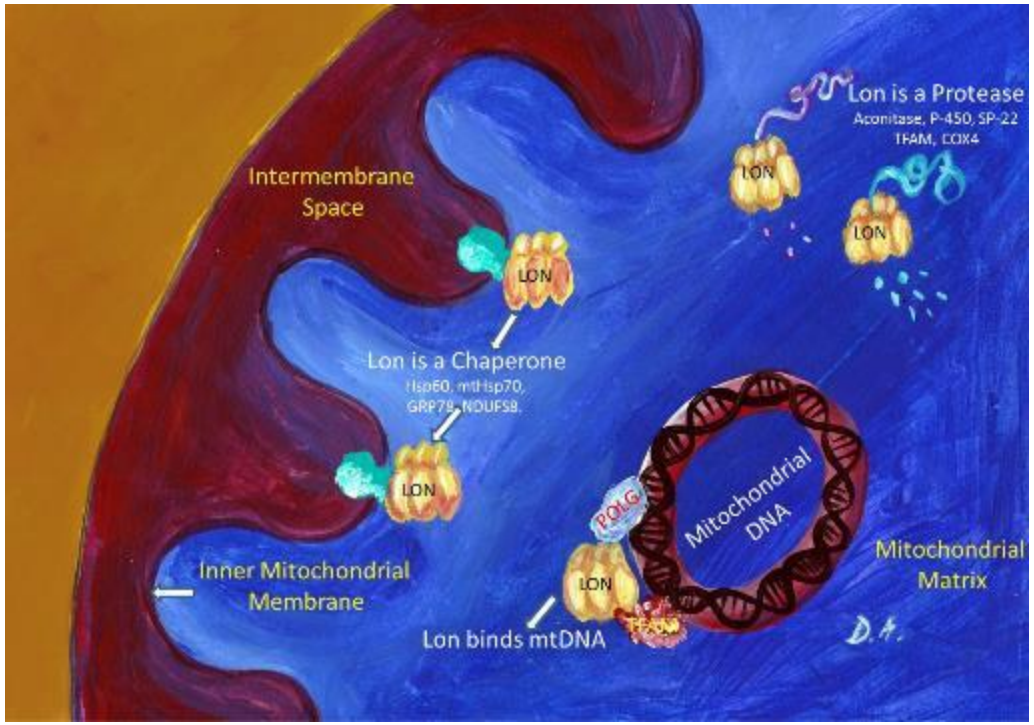
Mitochondrial homoeostasis and Lon protein.

IN-VITRO TEST

Lon is a protein which fulfils several important functions in mitochondrial homoeostasis:

- Associated with chaperones such as HSP-60 and mtHSP-70 it preserves the correct conformation of proteins.
- Protease activity: it is able to break down damaged proteins so they can be recycled.
- Associated with mitochondrial DNA, it is involved in the biogenesis of new mitochondria.

Previous Codif studies have shown that the expression of LON decreases with age,
-38% in a aged skin model compared to a young skin model



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1 - ACTIVATION OF MITOCHONDRIAL DETOXIFICATION PROCESSES.

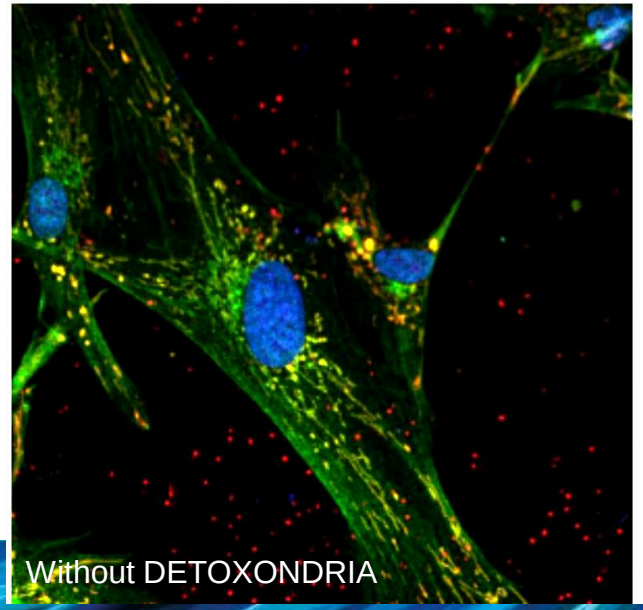
Detoxondria increases expression of the Lon protein.

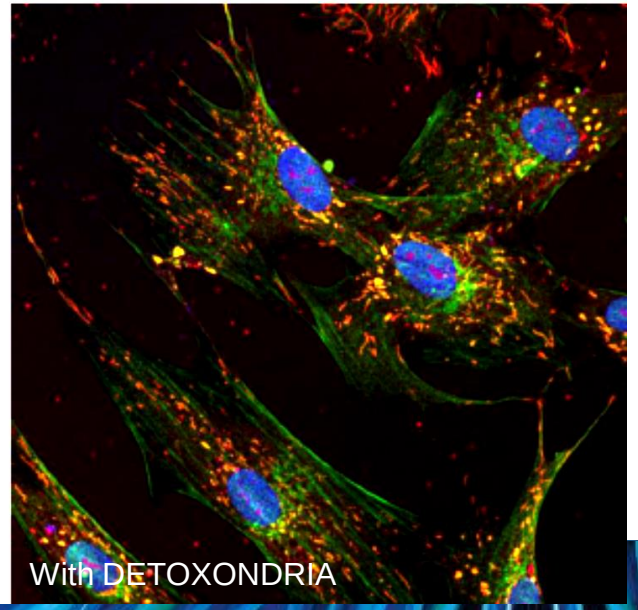
0.1% IN-VITRO TEST

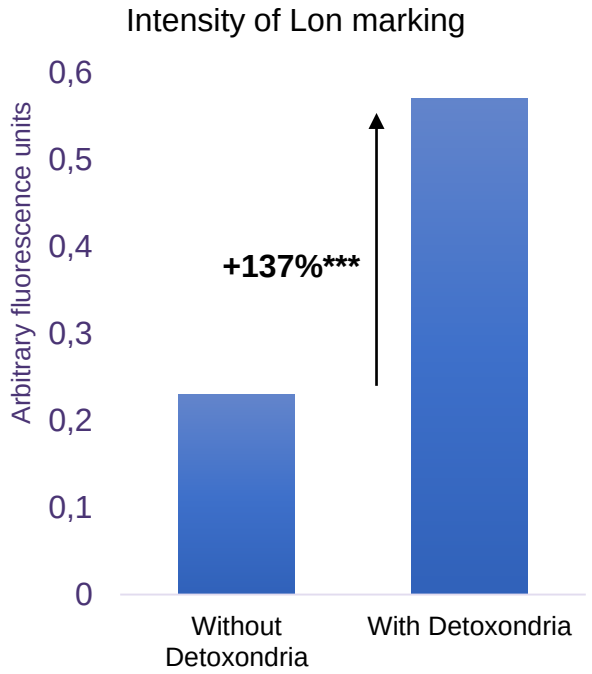
PROTOCOL
Dermal human fibroblasts from a donor of age 30 cultured with 0.1% Detoxondria for 48 hrs. Analysis of Lon expression by immunofluorescent marking using a confocal microscope.

+137%*** expression of Lon protein in the mitochondria.
*** p<0.001 Student t Test

Below: Lon marked in orange.







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2 - IMPROVEMENT OF MITOCHONDRIAL NETWORK.

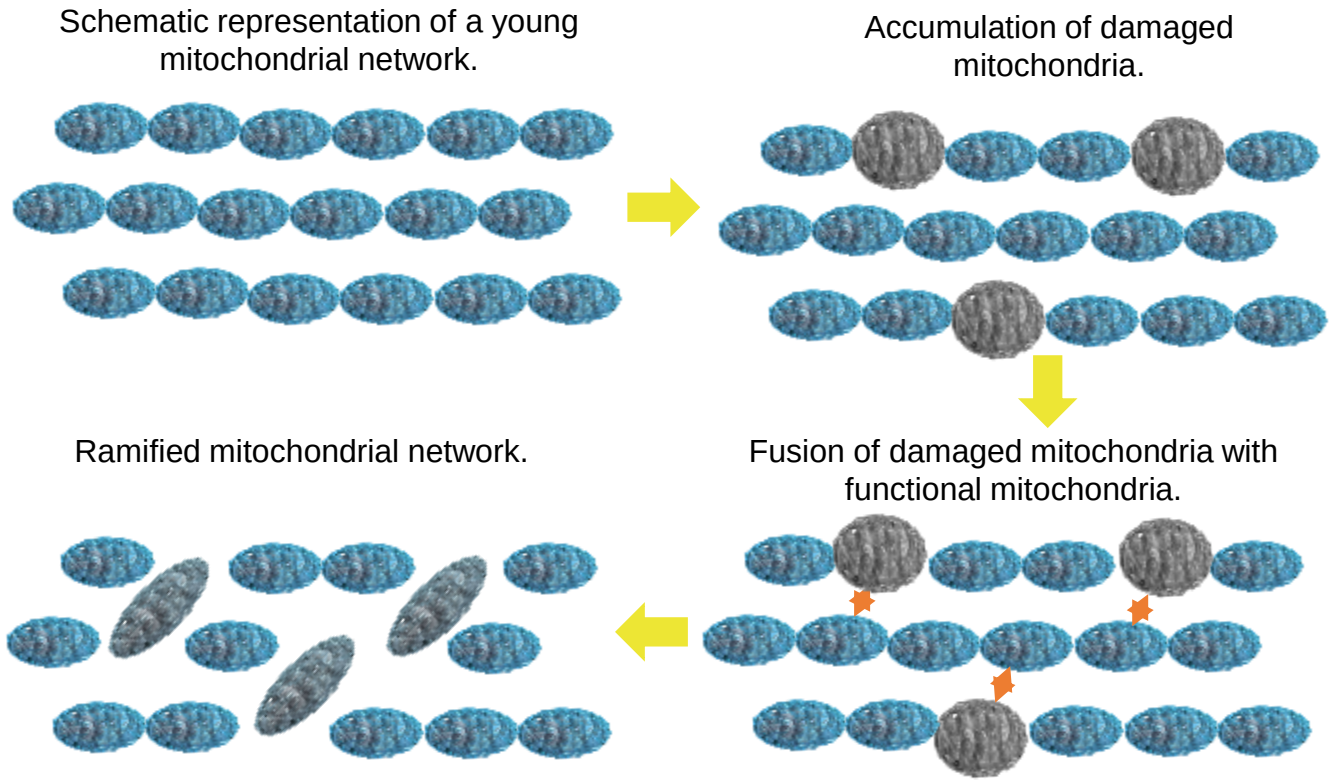
The Fusion Alternative

IN-VITRO TEST

As waste builds up in the mitochondria, the cells accumulate non-functional mitochondria.

BEFORE ACTIVATING MITOPHAGY THE CELLS ADOPT AN INTERMEDIATE STRATEGY:

They fuse defective mitochondria with functional mitochondria. This fusion strategy leads to the creation of a mitochondrial network with a more branch-like structure which is characteristic of senescent cells.



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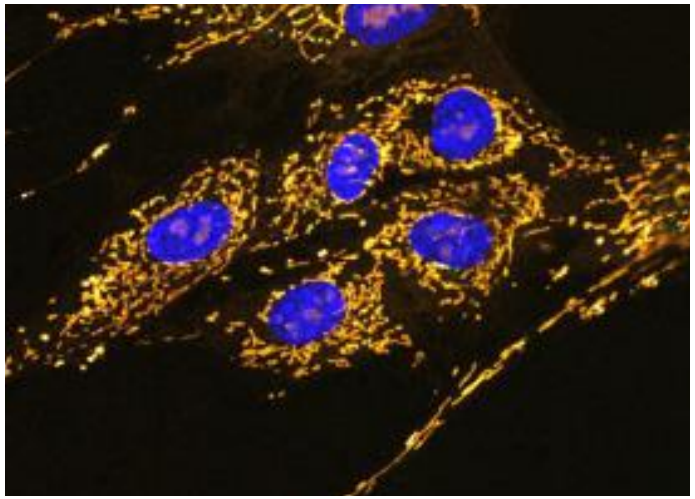
2 - IMPROVEMENT OF MITOCHONDRIAL NETWORK.

Detoxondria rejuvenates the mitochondrial network.

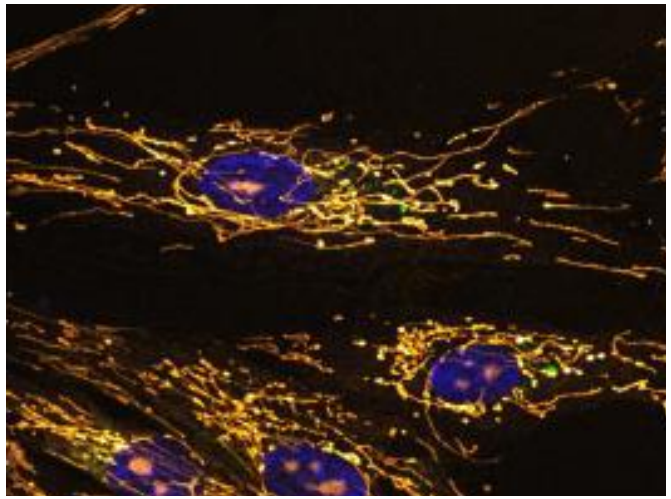
0.1%
IN-VITRO
TEST

PROTOCOL
Dermal human fibroblasts from a donor 54 years of age cultured with 0.1% Detoxondria for 48 hrs. Senescence is simulated by exposing the fibroblasts to 23 ageing cycles. Analysis of mitochondrial network using a confocal microscope.

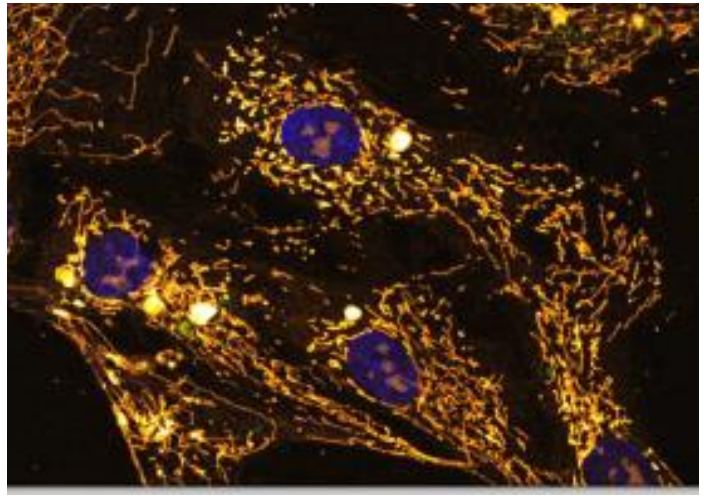
Mitochondria in orange, nuclei in blue.



Before senescence.



After senescence,
network highly ramified.



Senescence + Detoxondria
Return to a non-ramified network.

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2 - IMPROVEMENT OF MITOCHONDRIAL NETWORK.

Detoxondria reduces branch connections in the mitochondrial network.

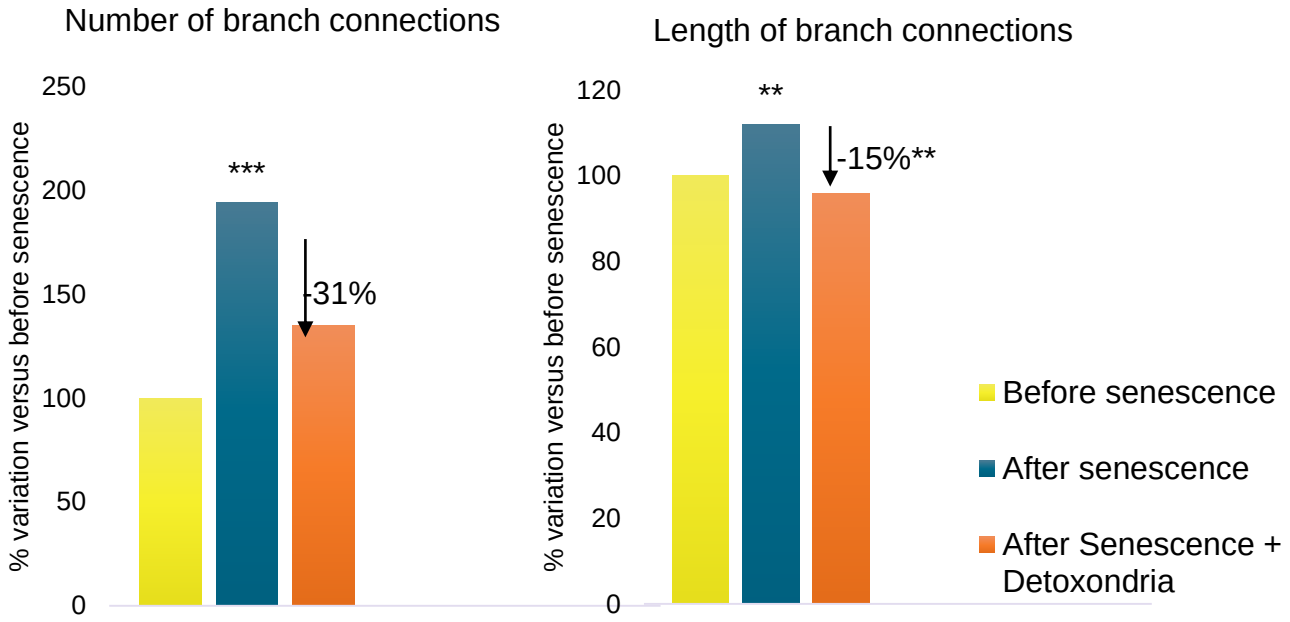
0.1% IN-VITRO TEST

PROTOCOL
Dermal human fibroblasts from a donor 54 years of age cultured with 0.1% Detoxondria for 48 hrs. Senescence is simulated by exposing the fibroblasts to 23 ageing cycles. Analysis of mitochondrial network using a confocal microscope.

By improving recycling of waste by stimulating the Lon protein, Detoxondria limits the number of non-functional mitochondria and fusion processes.

The mitochondrial network is less ramified and a younger appearance is restored.

***p<0.05 / ***p<0.001 Student test*



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3 - IMPROVEMENT OF MITOPHAGIC PERFORMANCE INDEX.

Detoxondria increases the mitophagic performance index.

0.1% IN-VITRO TEST

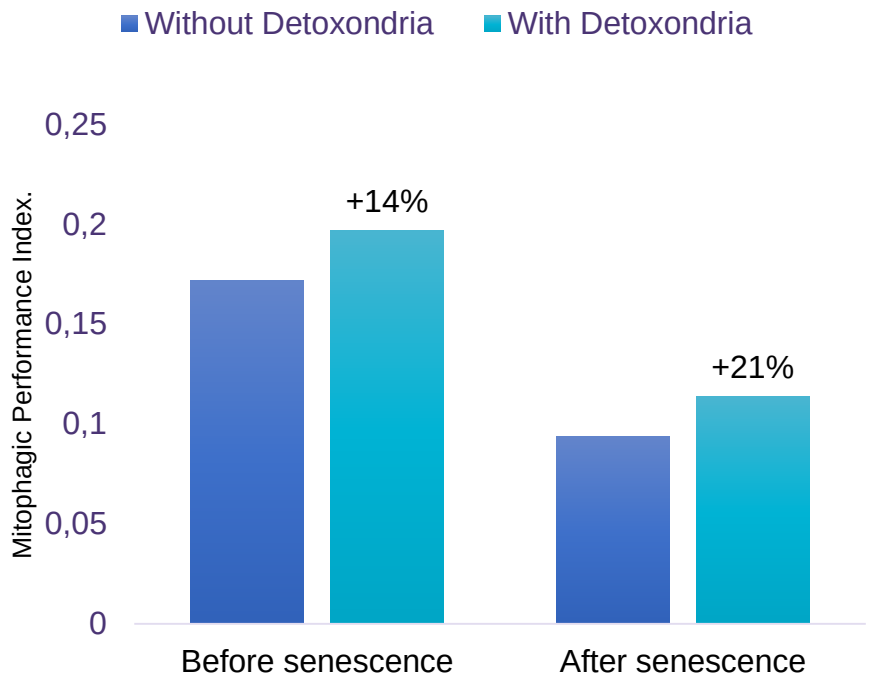
Activation of mitophagy is essential to cellular survival. It occurs when the waste recycling and fusion strategies are no longer sufficient.

DETOXONDRIA IMPROVES MITOPHAGIC PERFORMANCE INDEX

+ 14% for non-senescent cells
+ 21% for senescent cells

The increase in the mitophagic performance index shows an improvement in overall cellular detoxification whatever the age of the cells or their degree of senescence.

Variation in Mitophagic Performance Index.



PROTOCOL
Dermal human fibroblasts from a donor 54 years of age cultured with 0.1% Detoxondria for 48 hrs. Senescence is simulated by exposing the fibroblasts to 23 ageing cycles. Analysis of the mitophagic performance index using flux cytometry.

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3 - IMPROVEMENT OF MITOPHAGIC PERFORMANCE INDEX.

Detoxondria reverses cellular age.

0.1% IN-VITRO TEST

PROTOCOL
Dermal human fibroblasts from a donor 54 years of age cultured with 0.1% Detoxondria for 48 hrs. Senescence is simulated by exposing the fibroblasts to 23 ageing cycles. Analysis of the mitophagic performance index using flux cytometry.

DETOXONDRIA REJUVENATES FIBROBLASTS

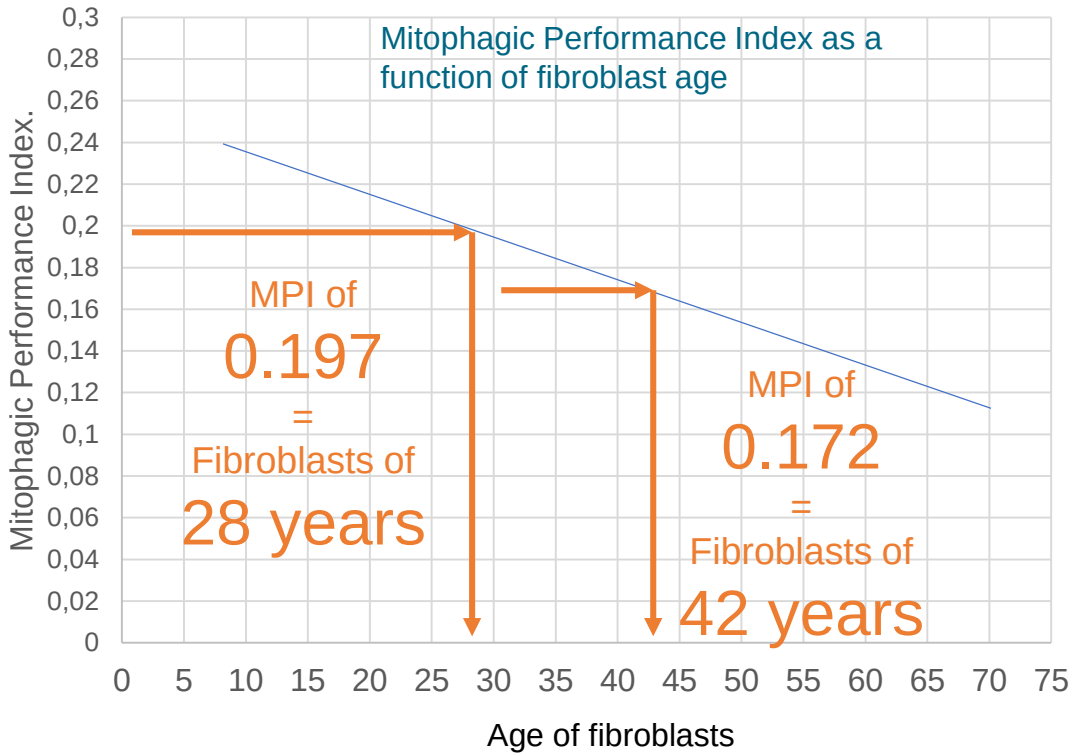
The work carried out on our panel of fibroblasts enables us to associate a Mitophagic Performance Index (MPI) with a cellular age.

Calculation of MPI and evaluation of cellular age:

MPI of 0.172 without treatment
= cellular age of 42 years

MPI of 0.197 after treatment with Detoxondria
= cellular age of 28 years

CELLULAR REJUVENATION BY 14 YEARS!



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“Every day, mitochondrial homoeostasis is threatened.
Respiration generates toxic free radicals which damage the component parts of the mitochondria.
This generates waste which builds up and interferes with the functioning of this vital organ, endangering the life itself of the cell.”

→ Detoxondria improves the recycling of metabolic waste which rejuvenates the overall structure of the mitochondrial network.

“When the accumulation of damage to the mitochondria reaches the point of no return, the cell initiates a survival reflex to recycle the damaged mitochondria: mitophagy.
As they lose the ability to activate mitophagy, non-functional mitochondria build up and the cells enter a senescent phase”.

→ Detoxondria improves the Mitophagic Performance Index which rejuvenates the cells by 14 years!

A DETOXIFYING EFFECT OF DETOXONDRIA

IN VIVO BENEFITS

0.75%
IN-VIVO
TEST

PROTOCOL - 1

- 23 volunteers aged 51 to 65.
- Displaying a dull skin with signs of fatigue, shadows or bags under the eyes.
- 2 applications a day of a cream containing 0.75% Detoxondria on half of the face and a control on the other half.

PARAMETERS ANALYSED

- Oxygenation of the skin by measuring the partial pressure of O2 using a radiometer.
- Clinical evaluation of detoxifying and anti-fatigue effects by an expert on an analogue scale.
- Luminosity of the skin using photographs taken under polarised light.

PROTOCOL - 2

- 35 volunteers aged 50 to 65.
- Exhibiting fatigued skin and a loss of firmness and tone.
- 2 applications a day of a cream containing 0.75% Detoxondria on the face.

PARAMETERS ANALYSED

- Cutaneous fatigue and tone

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A DETOXIFYING EFFECT OF DETOXONDRIA

Detoxondria improves oxygenation of the skin.

0.75%
IN-VIVO
TEST

The transcutaneous partial pressure of O2 (TcPO2) is used to assess the degree of oxygenation of the skin.
An increase in this parameter means the oxygenation of the skin has increased.

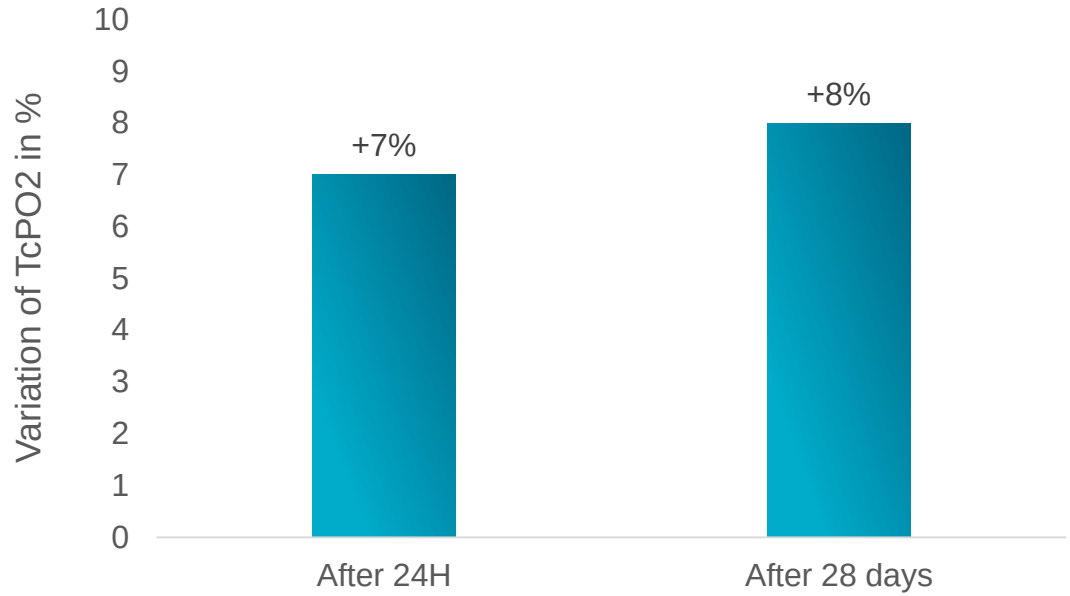
VARIATION IN TRANSCUTANEOUS OXYGEN PRESSURE VERSUS PLACEBO

+7% on average after 24 hours
And up to +126%

+8% on average after 28 days
And up to +60%

Detoxondria increases oxygenation of the skin after 24 hrs after a single application.

Variation of transcutaneous partial pressure of O2 versus placebo



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A DETOXIFYING EFFECT OF DETOXONDRIA

Detoxondria improves oxygenation of the skin And removes dull complexion

0.75% IN-VIVO TEST

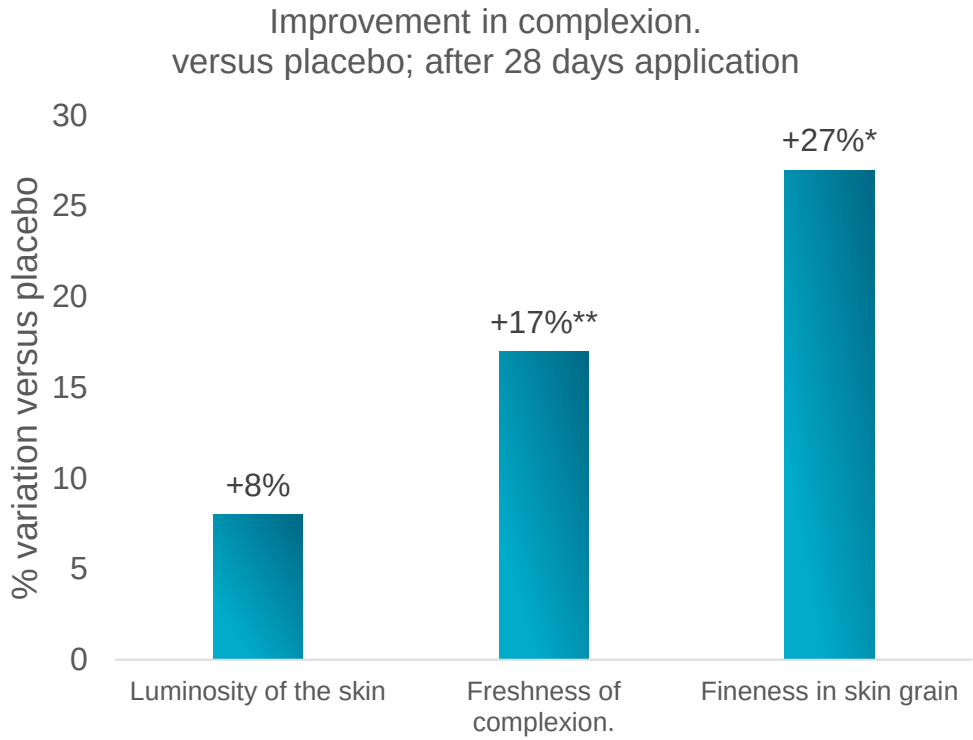
By promoting oxygenation of the skin, Detoxondria improves the beauty of the complexion and the skin is detoxified.

AFTER 28 DAYS AND VERSUS THE PLACEBO IMPROVEMENT IN:

Luminosity of the skin by + 8% on average
And up to +100 %

Freshness of the skin by + 17% **on average
And up to +100 %

The grain of the skin by + 27% *on average
And up to +400 %



*p<0.05 ; **p<0.01 Wilcoxon test

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DETOXIFYING EFFECT OF DETOXONDRIA

Detoxondria reduces the susceptibility of the skin to fatigue.

0.75% IN-VIVO TEST

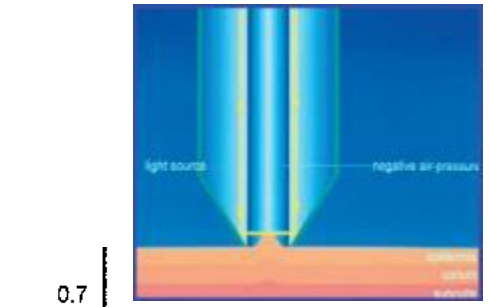
HOW TO MEASURE THE ELASTICITY OF THE SKIN

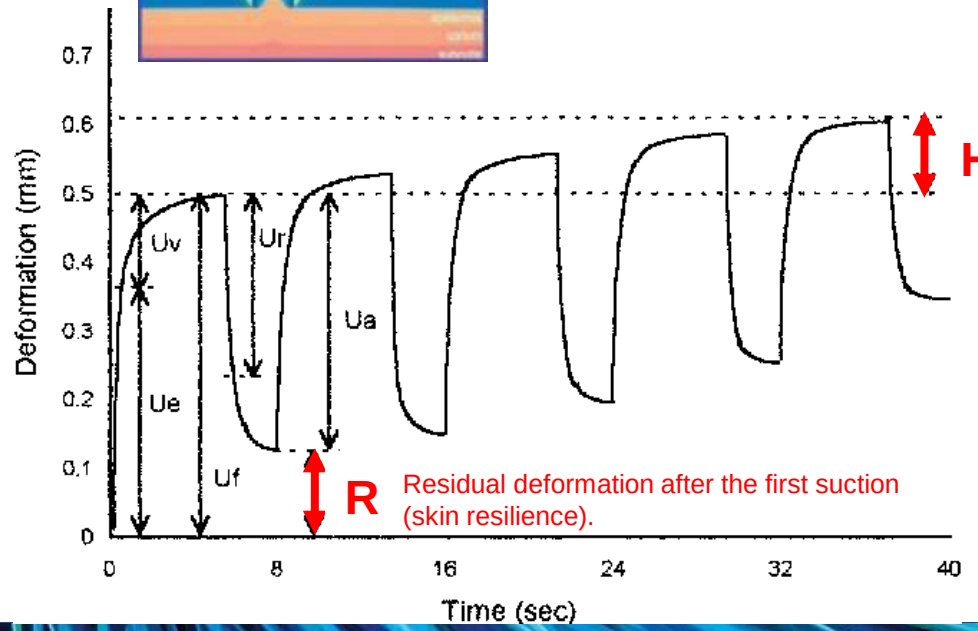
Method using the principles of cutometry:

Measurement of cutaneous elasticity is based on the suction method. Negative pressure is generated in the measuring head of the cutometer and repeated 10 times to “fatigue” the skin.

Each time suction is applied, the skin does not immediately return to its original condition but first remains in a slightly deformed state (a phenomenon called hysteresis).

The two parameters measured to assess the susceptibility of the skin to fatigue (elasticity) are hysteresis H and residual deformation R.





Difference in amplitude of deformation in the skin between the first and last suction.

Residual deformation after the first suction (skin resilience).

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DETOXIFYING EFFECT OF DETOXONDRIA

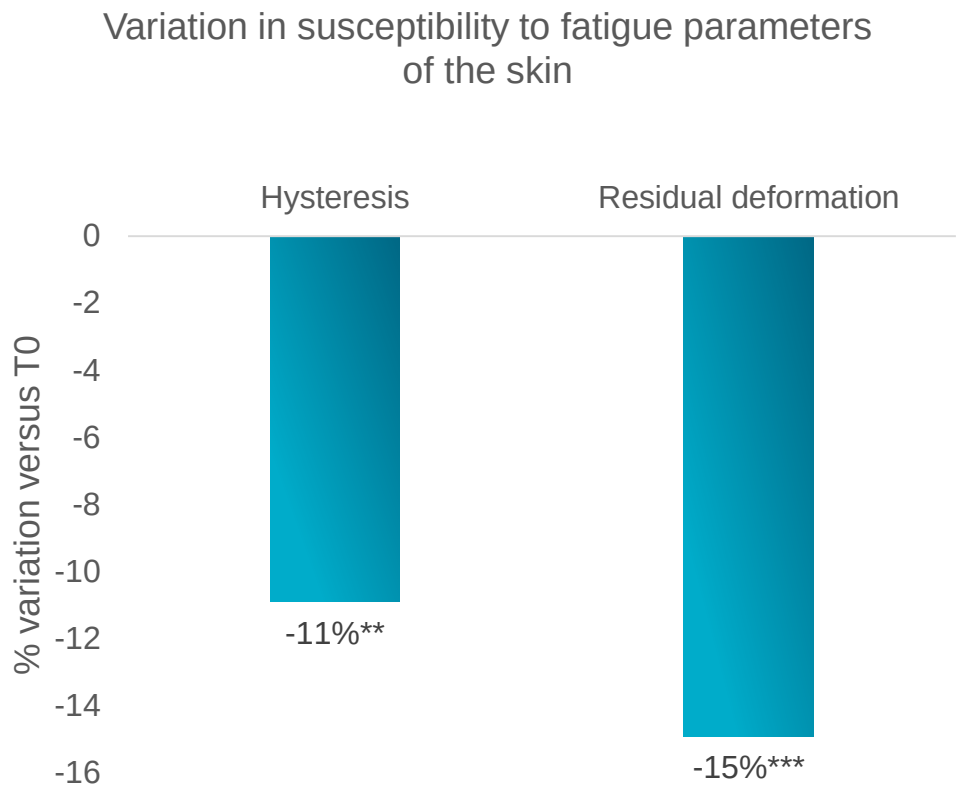
Detoxondria reduces the susceptibility of the skin to fatigue.

0.75%
IN-VIVO
TEST

DETOXONDRIA SIGNIFICANTLY DECREASES PARAMETERS OF SKIN FATIGUE:

-11% ** on average for hysteresis
and up to -66%

-15% *** on average for residual deformation
and up to -33%



***p<0.01; ***p<0.001 Student test*

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DETOXIFYING EFFECT OF DETOXONDRIA

Detoxondria reduces signs of fatigue.

0.75%
IN-VIVO
TEST

CLINICAL EVALUATION OF VISIBLE SIGNS OF FATIGUE BY AN EXPERT

After 28 days and versus placebo, Detoxondria leads to a reduction in:

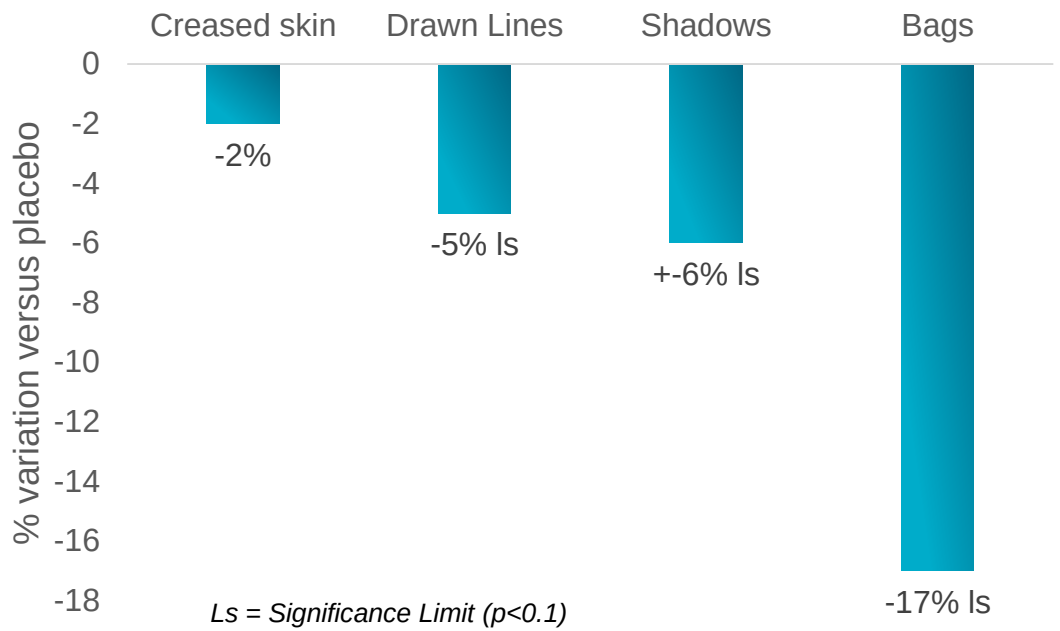
Creased appearance of the skin: - 2% on average
and up to -33%

Drawn lines: -5% on average
and up to -30%

Shadows: -6% on average
and up to -100%

Bags under the eyes: 17% on average
and up to -67%

Variations in visible signs of fatigue versus placebo



Ls = Significance Limit (p<0.1)

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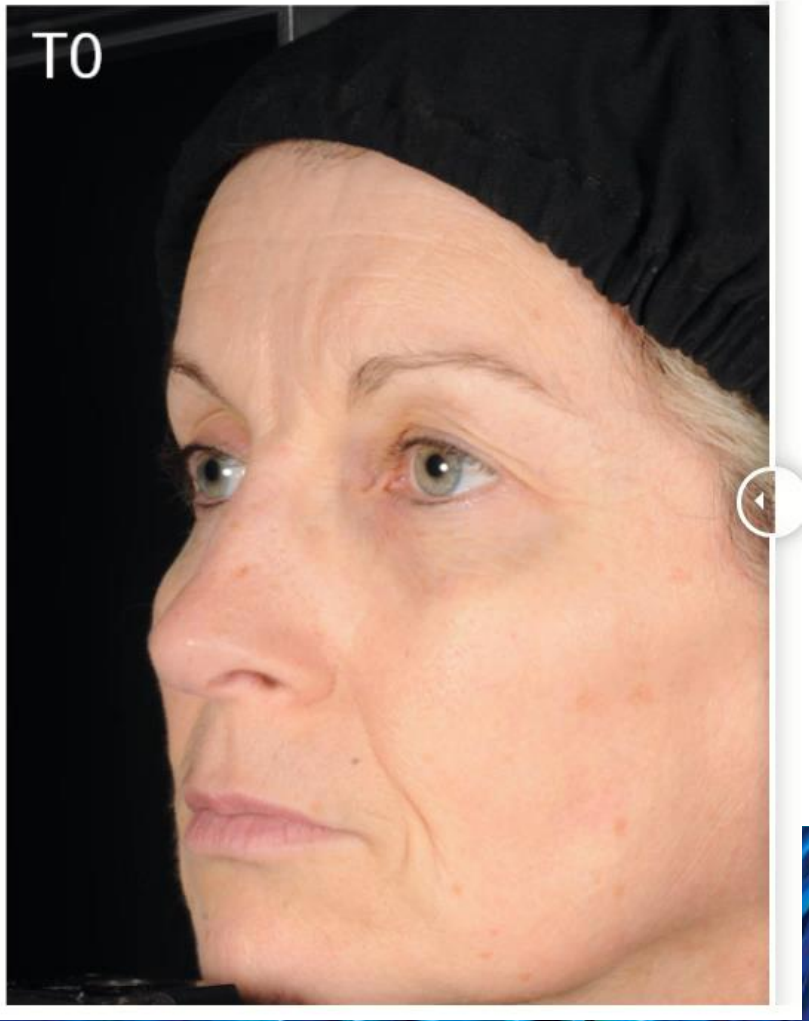
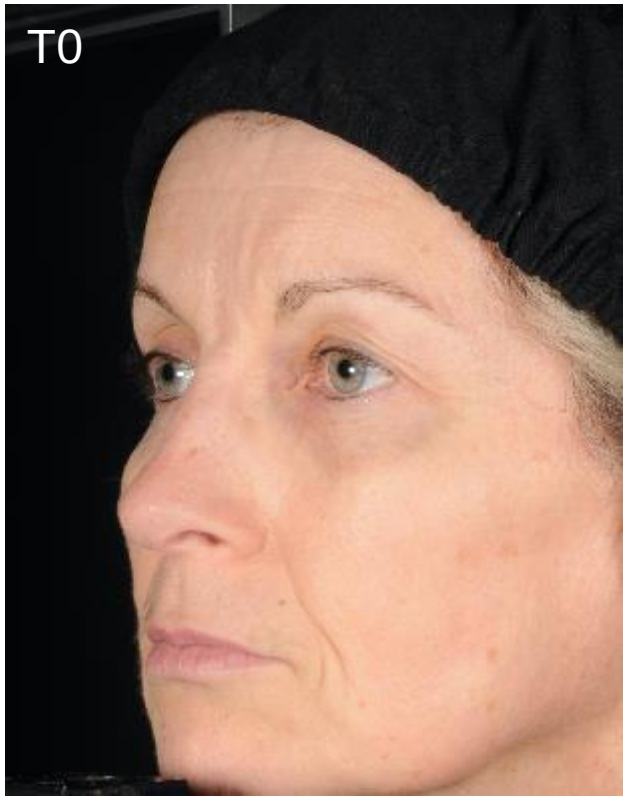
DETOXIFYING EFFECT OF DETOXONDRIA

Visible benefits on skin luminosity

0.75%
IN-VIVO
TEST





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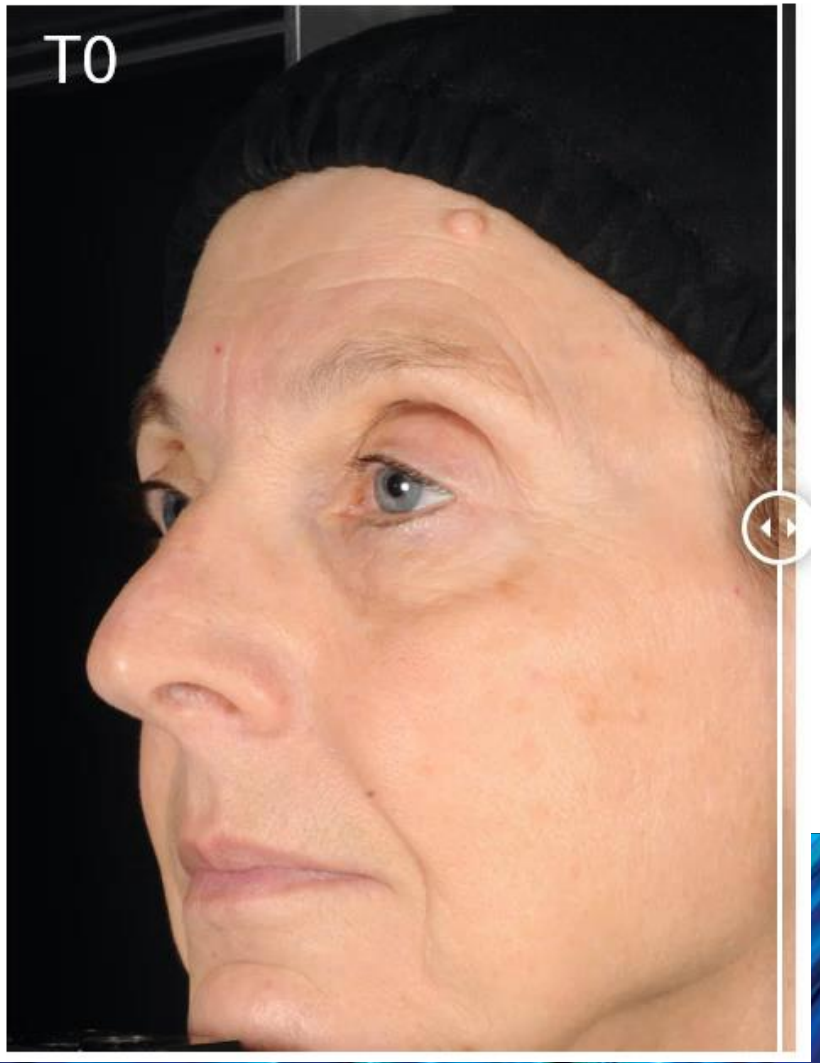
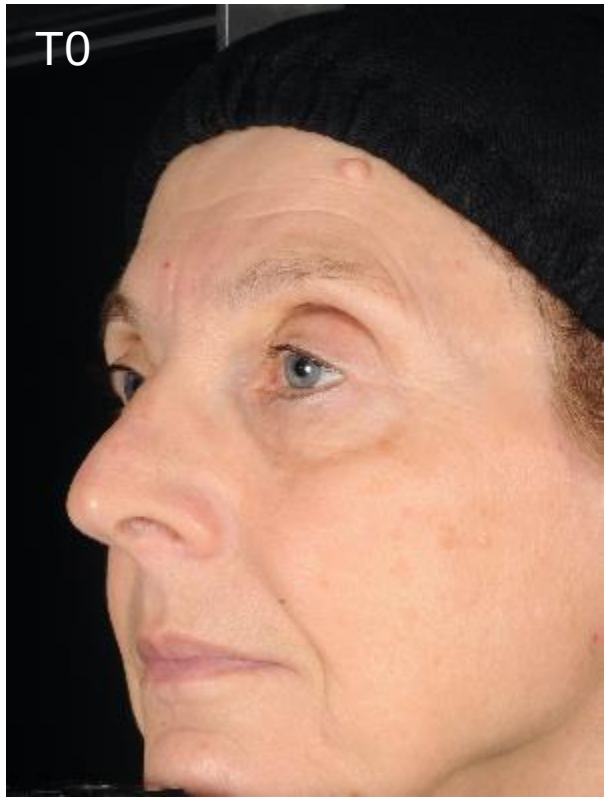
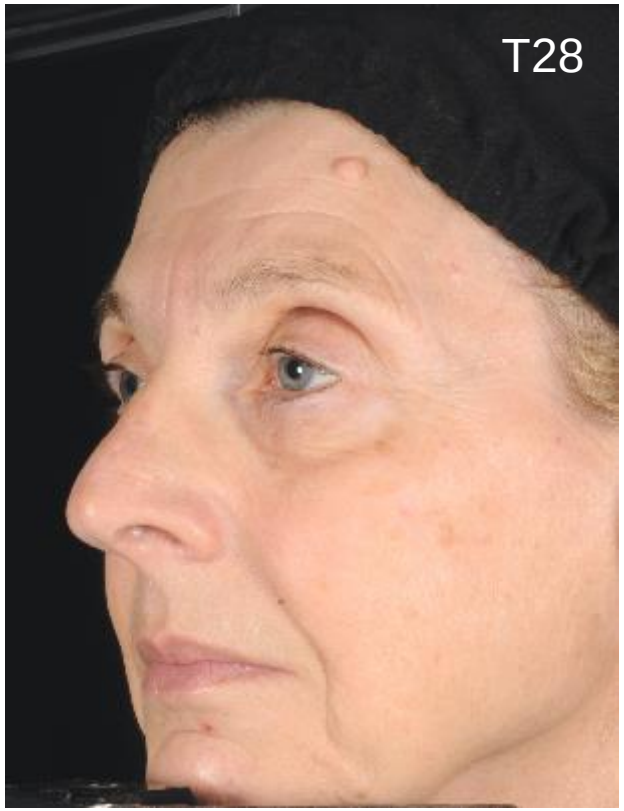
DETOXIFYING EFFECT OF DETOXONDRIA

Visible benefits on skin luminosity

0.75%
IN-VIVO
TEST







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DETOXONDRIA – HOW TO USE IT

TO PROMOTE DETOXIFICATION

- Increase in Lon synthesis
- Increase in Mitophagic Performance Index
- Improved oxygenation of the skin

TO REJUVENATE THE SKIN

- Improvement in mitochondrial network
- Rejuvenating effect on senescent cells
- Improvement in luminosity, grain and freshness of the skin.

TO REVIVE FATIGUED SKIN

Reduced cutaneous susceptibility to fatigue
Reduced creased effect, drawn lines, shadows and bags

FORMULATION ADVICE

Water soluble. Formulate up to 50 °C maximum.
Complete formulation guide available on request.

USE

INCI

DETOXONDRIA PA
Water (and) Sea salt (and) Hydrolyzed Rhodophyceae extract (and) Phenethyl alcohol

% USE

0.75%

APPROVED
COSMOS
ECOCERT

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INDICATIVE FORMULATION
Detox Booster Cream

Phase	Raw Material	INCI	%
A	DEMINERALIZED WATER	Aqua	64.35
	ELESTAB CPN (1)	Chlorphenesin	0.27
	EDETA BD (1)	Disodium EDTA	0.10
	DOUBLE DISTILLED GLYCERINE CODEX (2)	Glycerin	5.00
B	ARISTOFLEX AVC (3)	Ammonium acryloyldimethyltaurate/vp copolymer	1.00
C	SP BRIJ S2 MBAL-PA-RB (4)	Steareth-2	3.00
	BRIJ 721P (2)	Steareth-21	2.00
	CETYL ALCOHOL / LANETTE 16 (1)	Cetyl alcohol	2.20
	SOFTISAN 100 (5)	Hydrogenated coco-glycerides	2.00
	LIPOWAX TABLETS (6)	C10-18 triglycerides	1.50
	EUTANOL G (1)	Octyldodecanol	7.30
	LANOL 99 (7)	Isononyl isononanoate	7.70
	PHENOXYETHANOL (8)	Phenoxyethanol	0.80
	SILICONE (DIMETHICONE (100CS)) (9)	Dimethicone	1.00
D	SODIUM HYDROXIDE 6.25N 910)	Aqua & Sodium Hydroxide	0.03
E	COVI-OX T90EU C (1)	Tocopherol & Helianthus annuus seed oil	0.05
	FRAGRANCE	Parfum	0.20
	DETOXONDRIA (11)	Maris aqua & Glycerin & Propanediol & Hydrolyzed rhodophyceae extract	1.50
			100.00

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DETOXONDRIA

Detoxifies, oxygenates and revitalises fatigued skin.
For a more uniform and luminous complexion.

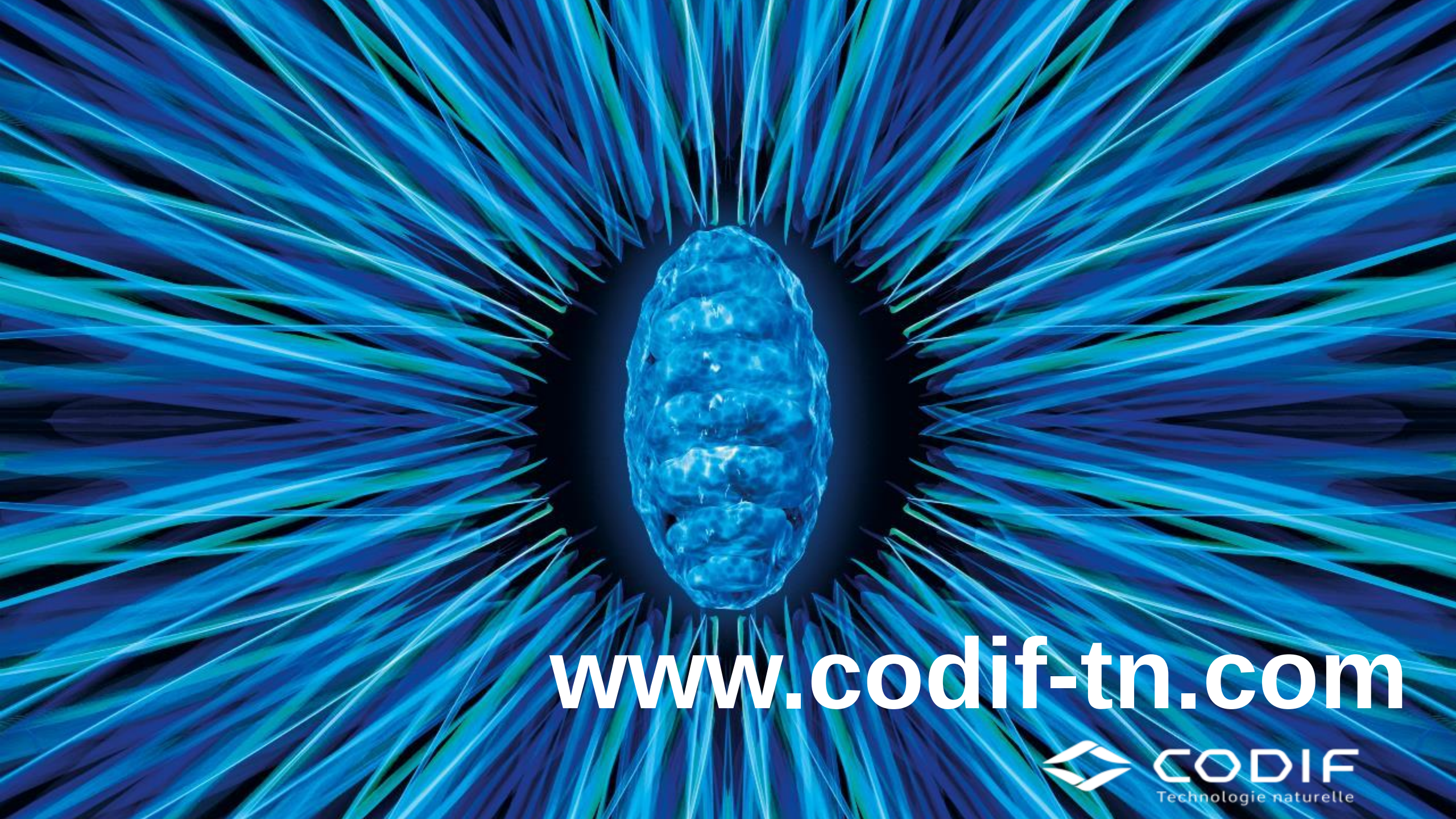
For the first time in cosmetics, Codif Laboratories has described a method for determining cellular senescence based on 3 cellular variables: cell size, mitochondrial mass, autophagia and has defined a MITOPHAGIC PERFORMANCE INDEX.

USE IN COMBINATION WITH:

EARLY BOOST: in a revitalising serum booster.

PHYCOJUVENINE: in a general anti-ageing cream based on a mitochondrial homoeostasis strategy.

ACTIPORINE 8G: in a skin detoxification treatment.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