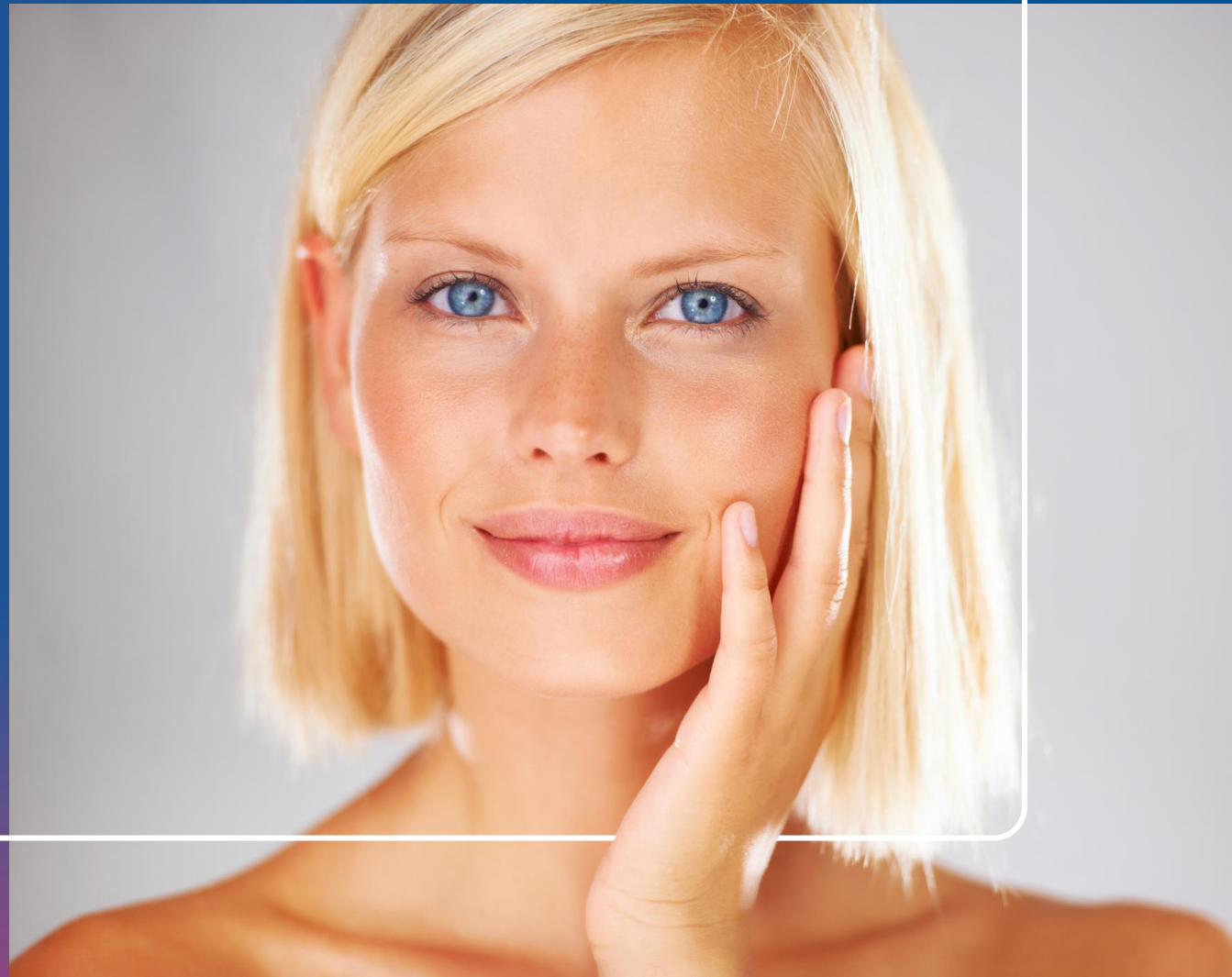


RADICARE®-GOLD

# Discover the secret of natural radical protection

RAHN  
COSMETIC  
ACTIVES



swiss expertise 

# When your skin's defence

mechanism becomes weak, the skin starts to age

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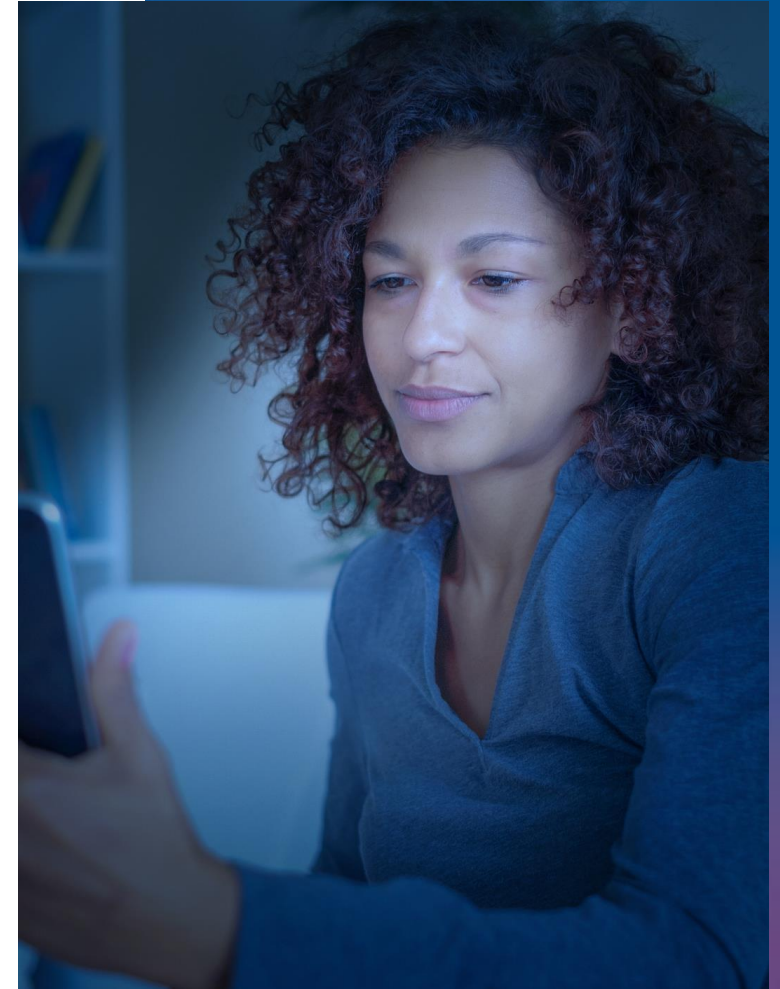
## Our lifestyle: digitally connected

The use of digital media has sped up our lifestyle. It also exposes us to unhealthy blue light continuously. The result: we feel fatigued, unbalanced and stressed.

## The skin has its own protective mechanism

Healthy nutrition forms an antioxidant protection shield in the skin barrier. Vitamins and carotenoids work against internal and external ROS stressors. If this protection shield weakens, skin ageing occurs.

» **The solution: RADICARE® GOLD** – protection shield for our skin, defends the skin barrier and cells from external attacks and slows down the ageing process for a youthful appearance.



# RADICARE®-GOLD

strengthens the skin's protective mechanism

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Strengthens the skin's protective mechanism



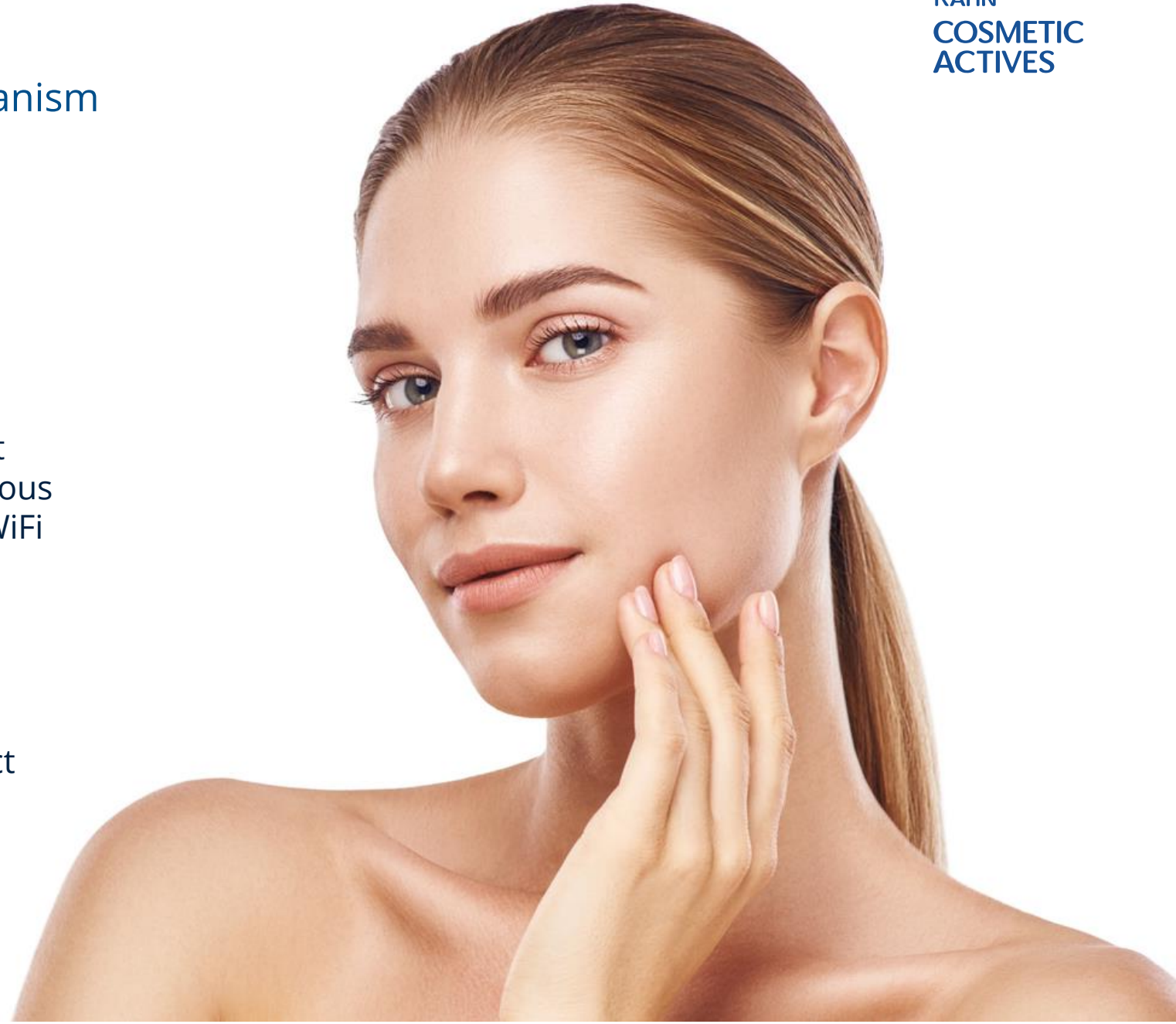
Protects against radiation from various sources, such as WiFi



Reduces ROS production and protects cells



Includes anti-ageing effect

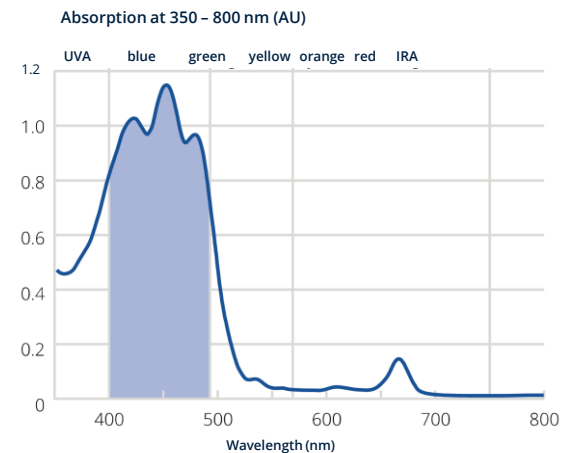
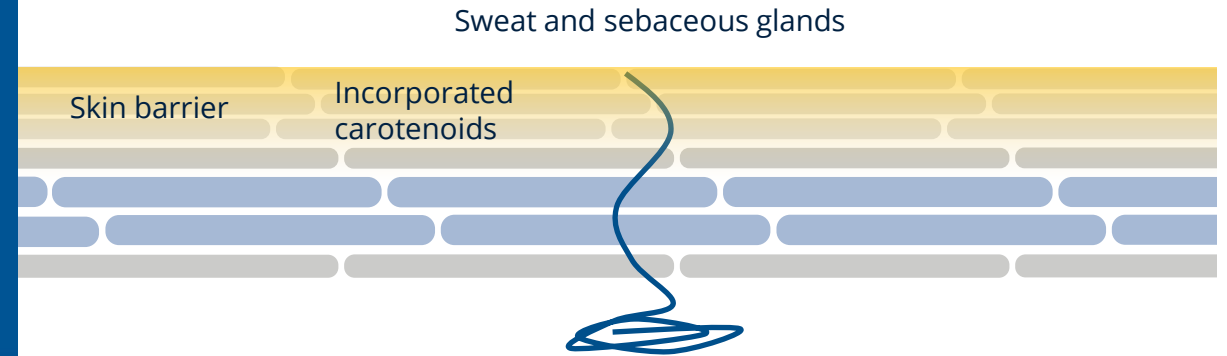


# The skin's defence mechanism:

A protection shield made of carotenoids

## BETA-CAROTENE AND LUTEIN

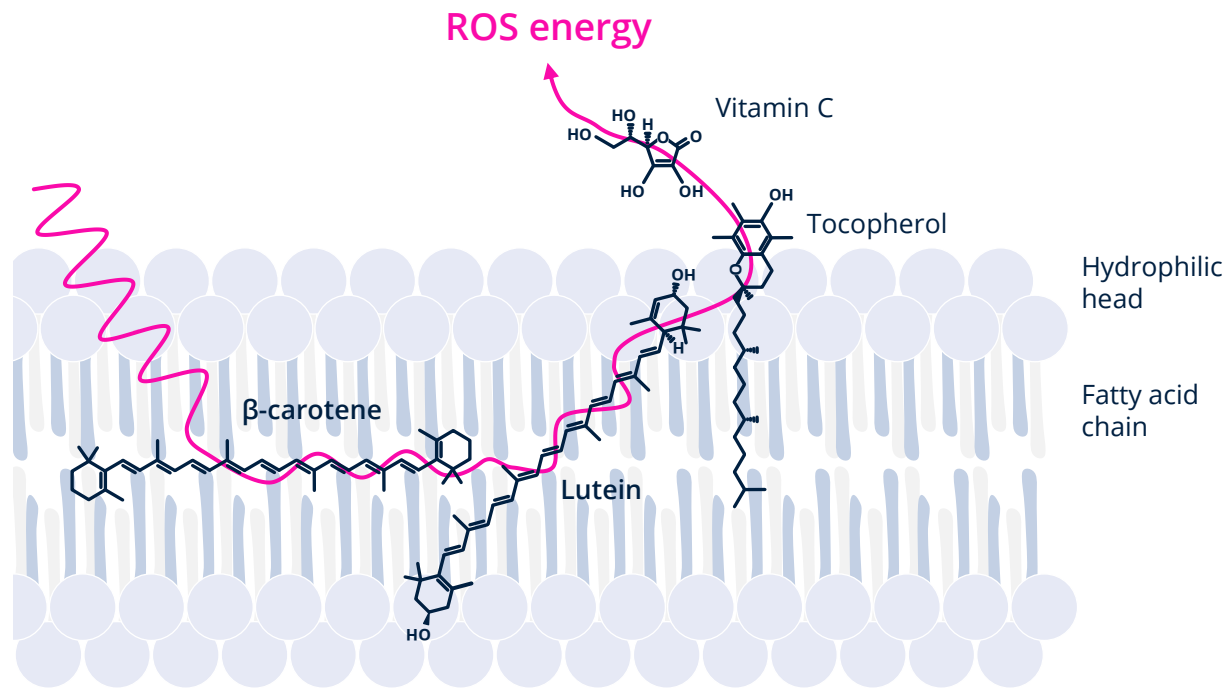
- Are natural, plant-based fat-soluble pigments
- Lutein is a xanthophyll, containing more polar headgroups
- Absorb blue light (High energy visible light) close to the UV-A spectrum
- Are absorbed through food and deposited on the skin via sweat and sebaceous glands
- Soak into the skin barrier and protect the skin from harmful ROS and HEV light



# The skin's defence mechanism:

A Faraday shield made of carotenoids

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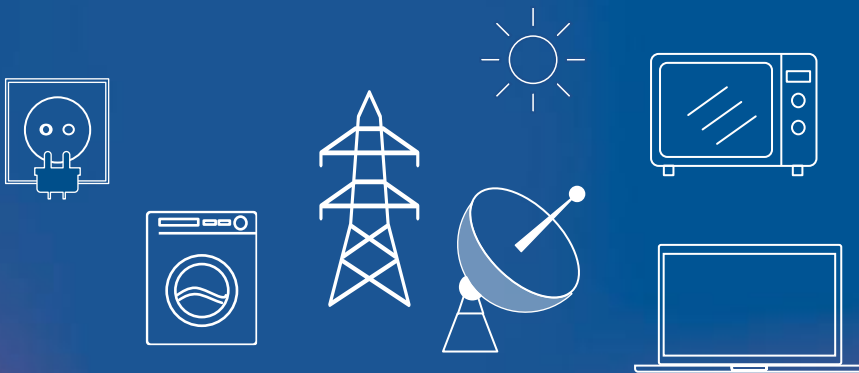
## COMPLETE LIPID ANTIOXIDATION SYSTEM

- Biomembranes or skin barrier lipids are organised in lipid bilayers
- They have polar head groups that point to the aqueous phase and a very lipophilic interior
- To protect the entire system, carotenoids like  $\beta$ -carotene and lutein are necessary
- These high-performance anti-oxidants are regenerated by tocopherol
- Tocopherol is regenerated by vitamin C, present in the aqueous phase

# External and internal influences weaken

the skin's defence mechanism

## EXTERNAL INFLUENCES



## INTERNAL INFLUENCES



Mitochondria / respiratory chain

WiFi radiation

Blue light

UV radiation

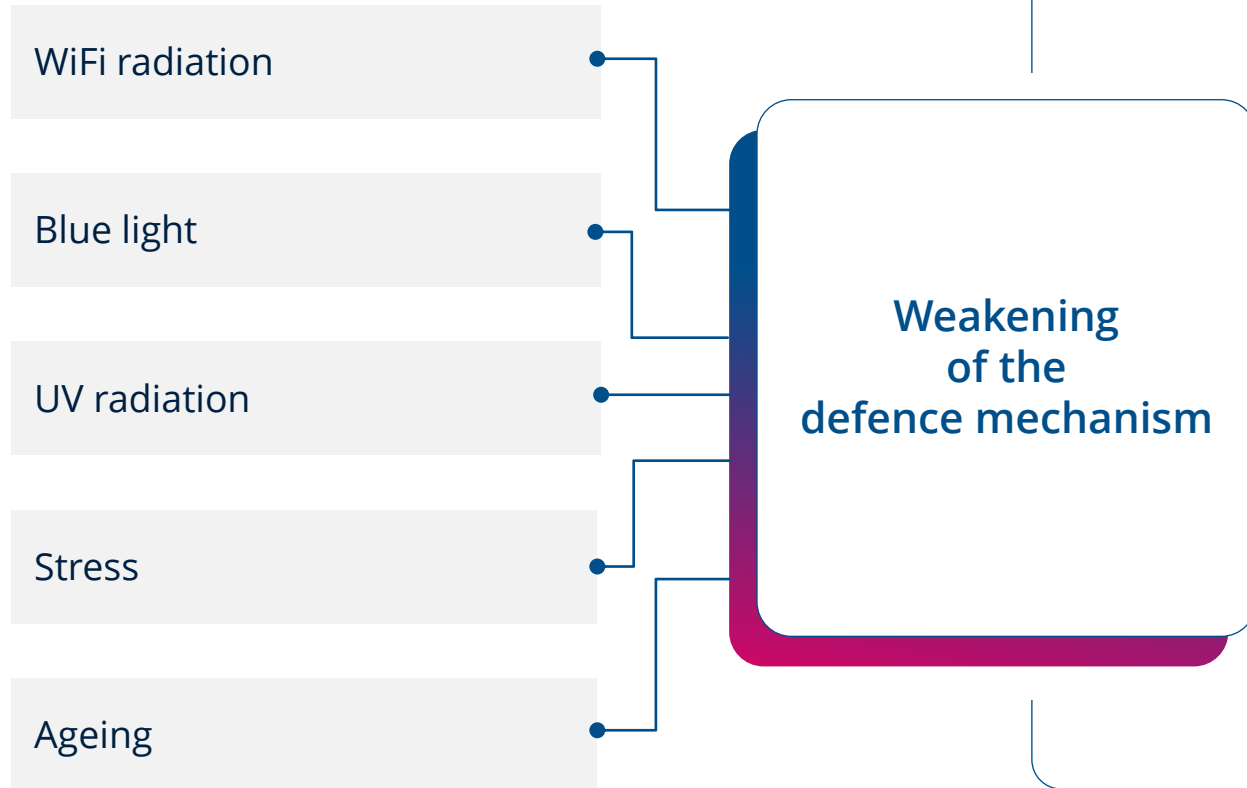
Stress

Ageing

Weakening  
of the  
defence mechanism

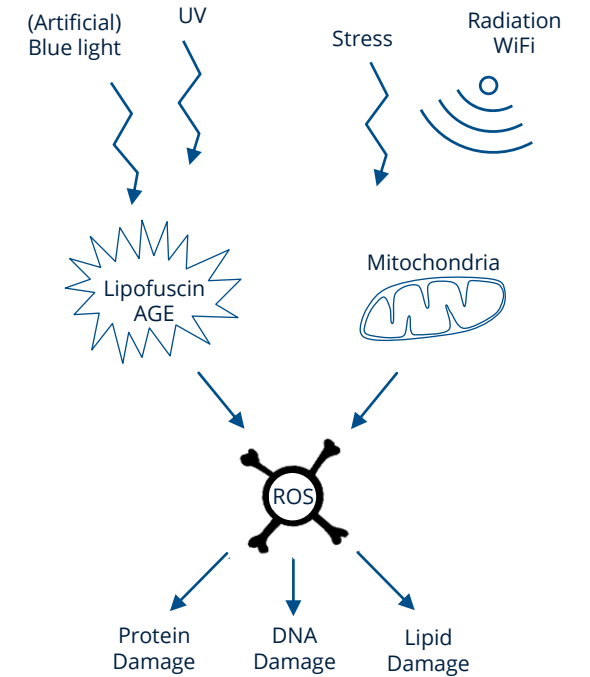
# When the skin's defence mechanism weakens, premature ageing occurs

## EXTERNAL & INTERNAL INFLUENCES



## ...WITH MAJOR CONSEQUENCES

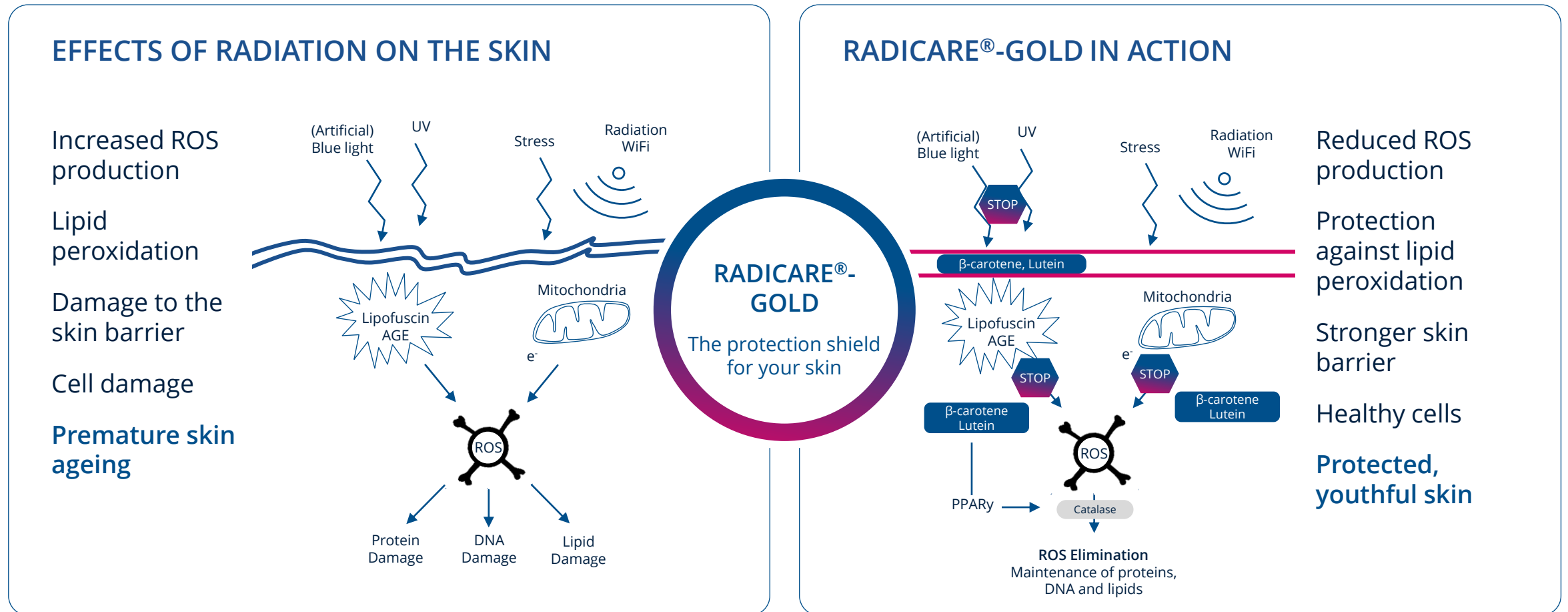
- Increased ROS production
- Lipid peroxidation
- Damage to the skin barrier
- Cell damage
- Premature skin ageing**



# RADICARE<sup>®</sup>-GOLD strengthens the defence

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mechanism and helps the skin regain its resistance to attacks



# RADICARE®-GOLD

The protection shield for your skin

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## IN A NUTSHELL

Inspired by the alga *Tetrademus obliquus*, which forms a natural protective carotenoid shield when exposed to light.

### Natural ingredients

The lipophilic algae extract contains a fully developed lipid anti-oxidation system in form of  $\beta$ -carotene, lutein and tocopherol.

### Optimum quality

of ingredients and production: RADICARE®-GOLD is made by experts and conforms to the most stringent quality standards.

## HIGHLY VERSATILE

### Face care & Body Care

- Products with an active formula for "anti-digital pollution"
- Cell protection, defence against blue light for daytime and sun exposure
- Night care: regeneration of the skin barrier with natural carotenoids
- Anti-ageing products
- "Aqua cosmetics" with a unique alga



**RADICARE®-GOLD** helps the skin to protect itself from external and internal influences.



swiss expertise 



# RADICARE®-GOLD

Meets the principles of circular kindness to the planet, the community and the people



# Potential marketing claims

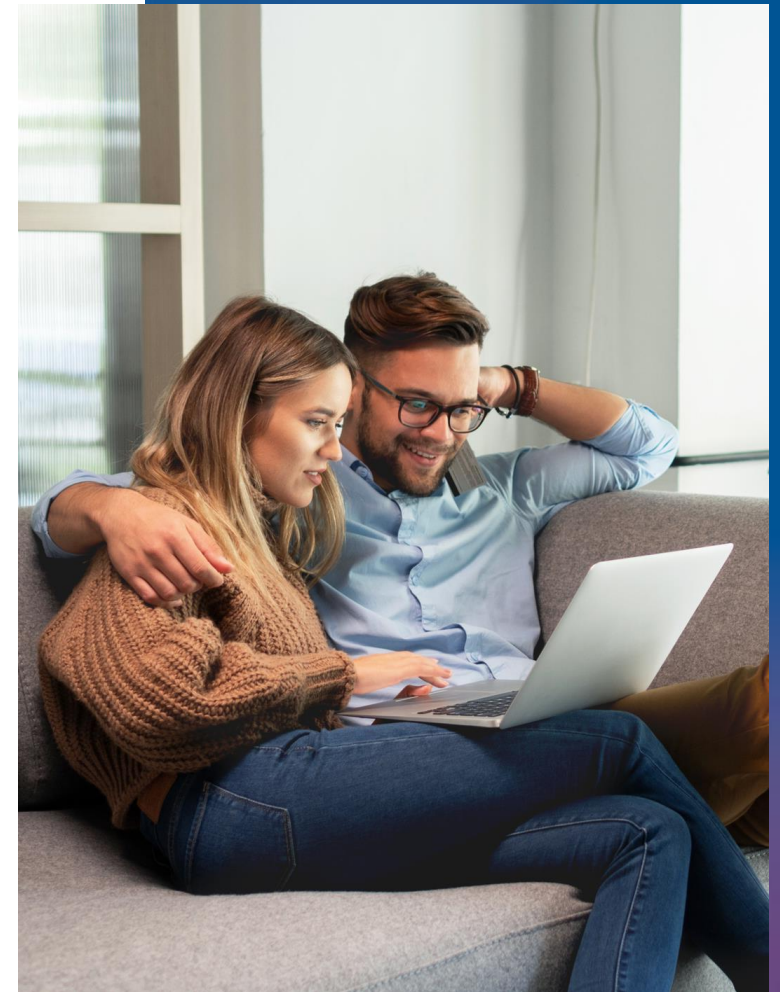
and benefits for your products

Enjoy the modern lifestyle by strengthening the skin barrier with carotenoids.

Protect your skin from free radicals caused by blue light or WiFi radiation.

Start the day with a dose of extra protection against HEV radiation.

Copy-and-Paste concept: the protective mechanism of algae for your skin.



# Scientifically proven effects

have demonstrated the effectiveness of RADICARE® GOLD

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## *IN-VIVO* STUDIES

Reduces carotenoid loss from the skin in the summer season

Reduces lipid peroxidation and strengthens the skin barrier

Increases skin moisture and slows down skin ageing

## *IN-VITRO* STUDIES

Activates the defence system of the cells against oxidative stress

Relieves cells of oxidative stress

Reduces oxidative stress induced by blue light

Reduces WiFi-induced oxidative stress

Protects cells from lipid peroxidation

Revitalises the epidermis



# RADICARE<sup>®</sup>-GOLD replenishes the stressed

carotenoid storage (*in-vivo* study)

## METHOD

Measurement of the carotenoid content of the skin using Multiple Spatially Resolved Reflection Spectroscopy (MSRRS), Biozoom.

## IMPLEMENTATION

Measurement at the end of February, waiting time for 3 months. Applying the formulation to the forearm twice a day between May and August for two months. Final measurement after application.

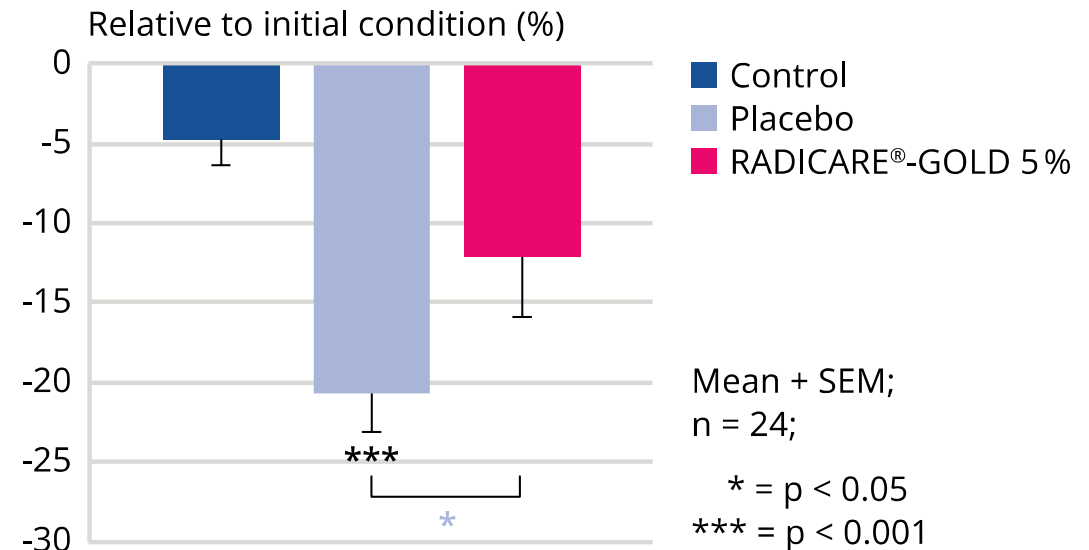
## RESULTS

Significant loss of carotenoids with placebo formulation. Significant less reduction with active formulation.

Reduces carotenoid loss in the summer months



## Reduction of carotenoid content



The study was carried out in Zurich with a maximum UV index of 10.5.



# RADICARE<sup>®</sup>-GOLD protects

against lipid peroxidation (*in-vivo* study)

## METHOD

Measurement of lipid peroxidation by means of corneocyte disruption and determination of the malondialdehyde concentration (MDA assay).

## IMPLEMENTATION

Application of a cosmetic formulation twice daily to the face for 28 days. Measurement after 28 days.

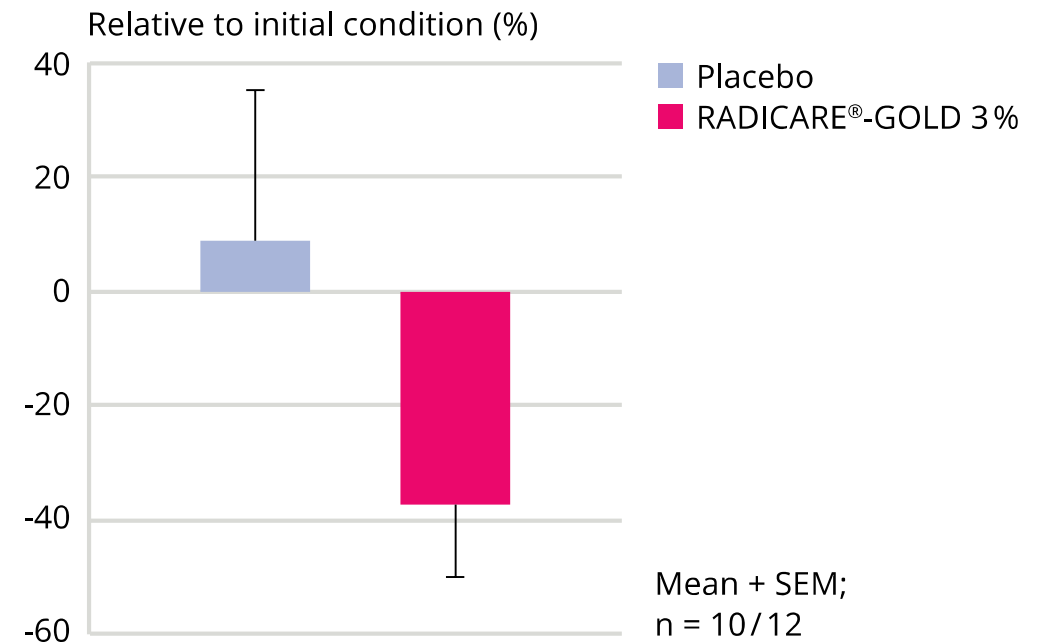
## RESULTS

Significant reduction in lipid peroxidation of skin barrier fats by 37%.



Helps protect the skin barrier

## Lipid peroxidation of the skin barrier



# RADICARE<sup>®</sup>-GOLD strengthens

the skin barrier (*in-vivo* study)

## METHOD

Measurement of the barrier strength by means of a corneocyte detachment (Corneofix F20, weight of detached corneocytes).

## IMPLEMENTATION

Application of a cosmetic formulation to the face twice a day for 28 days between July and August. Measurement after 28 days.

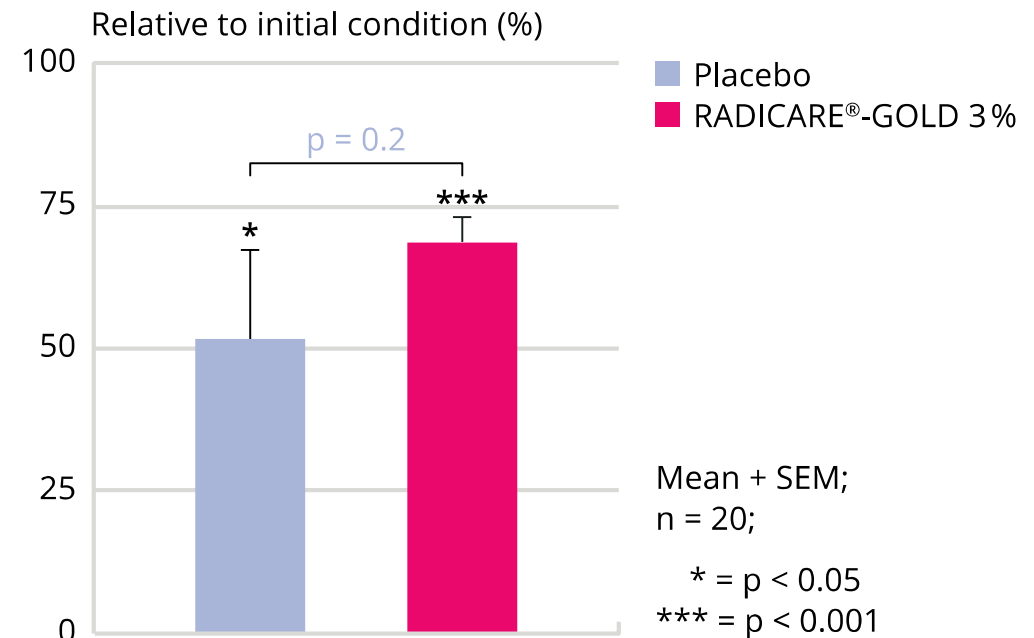
## RESULTS

Significant improvement of the skin barrier by 68 %.



Reinforces the skin barrier

## Increase in barrier strength



# RADICARE®-GOLD improves

skin moisture after only 14 days (*in-vivo* study)

## METHOD

Measurement of skin moisture using corneometry.

## IMPLEMENTATION

Application of a cosmetic formulation to the forearms twice a day for 28 days. Measurement after 14 and 28 days.

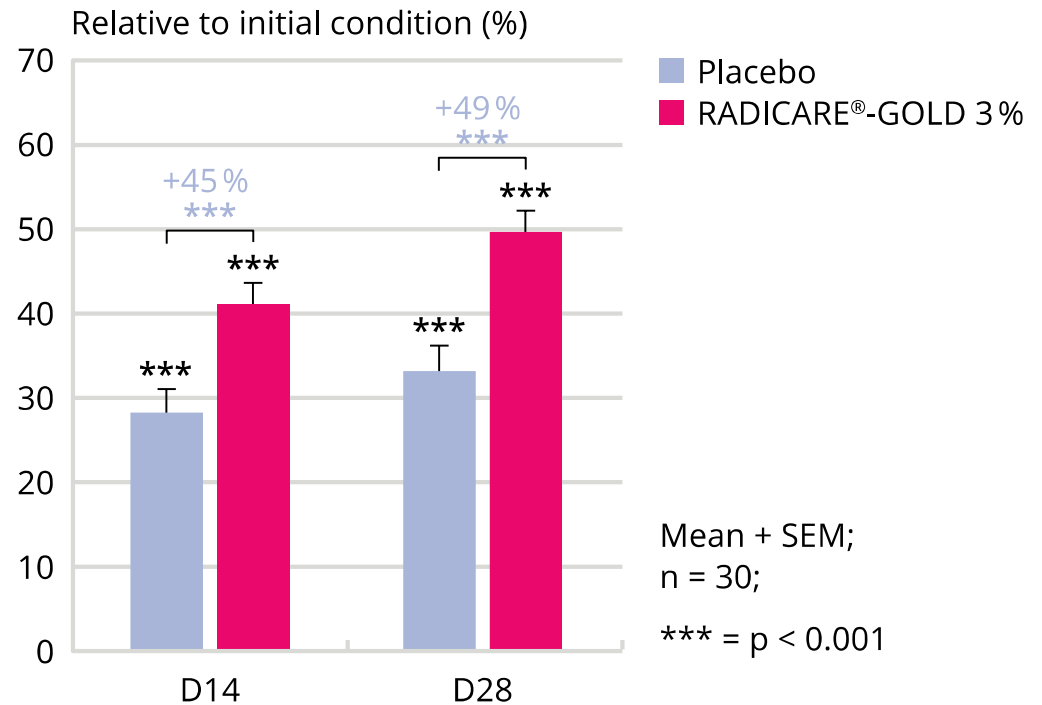
## RESULTS

Significant improvement in skin moisture by 49 % compared to placebo.



Improves skin moisture

## Improvement in skin hydration



# RADICARE<sup>®</sup>-GOLD improves

skin elasticity (*in-vivo* study)

## METHOD

Measurement of skin elasticity using cutometry.

## IMPLEMENTATION

Application of a cosmetic formulation to the forearms twice a day for 28 days. Measurement after 14 and 28 days.

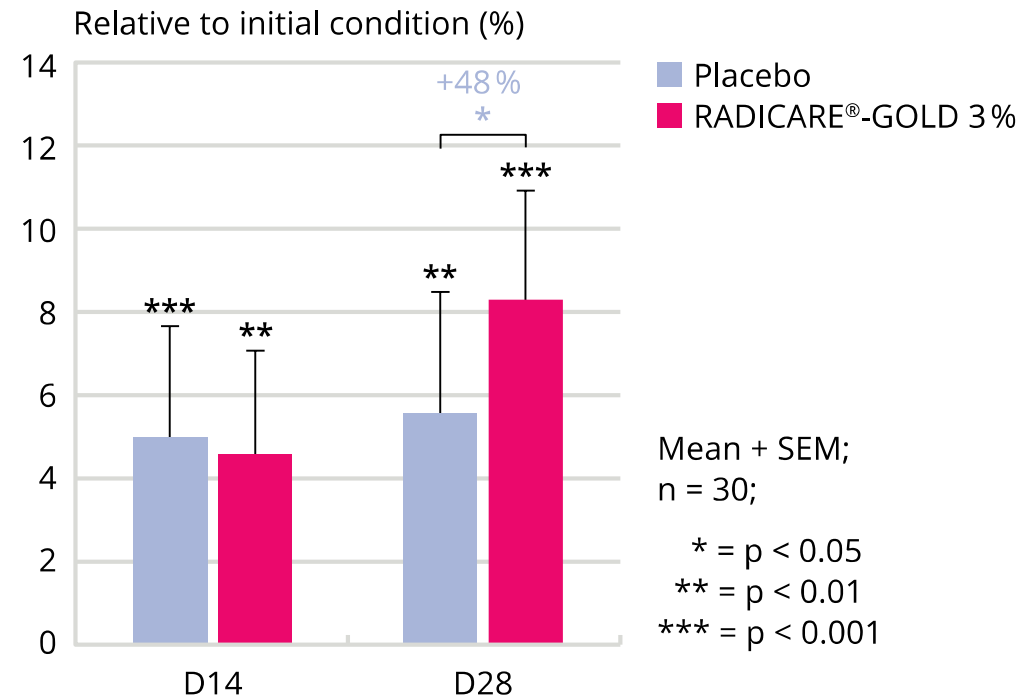
## RESULTS

Significant improvement in elasticity of 48 % compared to placebo.



Improves the elasticity of the skin

## Improvement in skin elasticity



# RADICARE<sup>®</sup>-GOLD improves

the evenness of the skin (*in-vivo* study)

## METHOD

Measurement of skin roughness using fringe projection (PRIMOS).

## IMPLEMENTATION

Application of a cosmetic formulation to the forearms twice a day for 28 days. Measurement after 14 and 28 days.

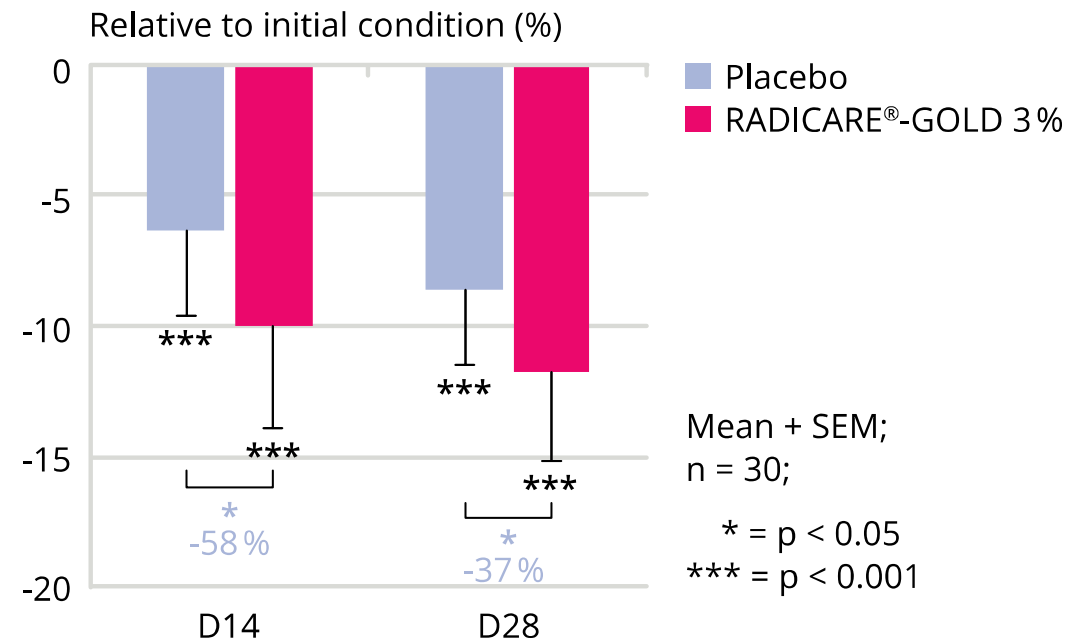
## RESULTS

Significant improvement in skin roughness by 58 % compared to placebo after only 14 days.



Improves the complexion

## Reduction of roughness



# RADICARE<sup>®</sup>-GOLD activates

the ROS defence system of the skin (*in-vitro* study)

## METHOD

Measurement of the activation of the PPAR receptors using the luciferase reporter gene assay.

## IMPLEMENTATION

Incubation of 3T3-L1 reporter cells (adipocytes) with RADICARE<sup>®</sup>-GOLD for 6 hours. Measurement of luciferase activity.

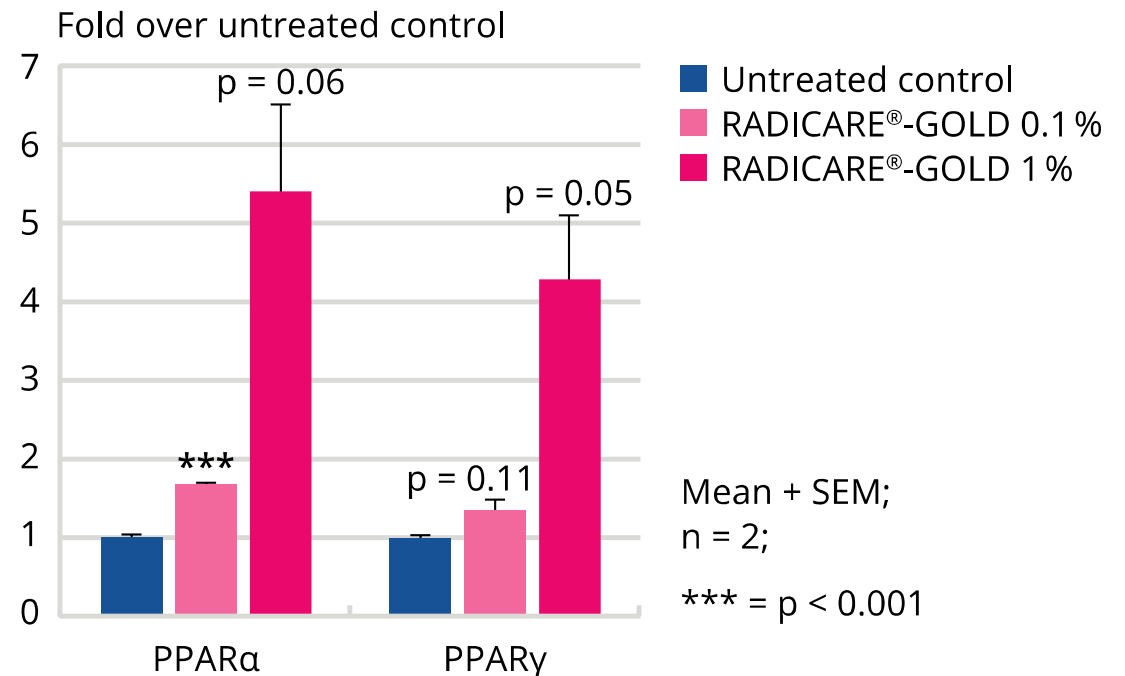
## RESULTS

Significant increase in PPAR receptor activity. PPAR $\gamma$  activation leads to increased expression of catalase, eliminating ROS (H<sub>2</sub>O<sub>2</sub>).



Activates the cell's ROS defence system

## Activation of PPAR $\alpha$ and PPAR $\gamma$



# RADICARE<sup>®</sup>-GOLD relieves the cells

of oxidative stress (*in-vitro* study)

## METHOD

Measurement of the intracellular ROS content using fluorescence staining (DCFDA kit).

## IMPLEMENTATION

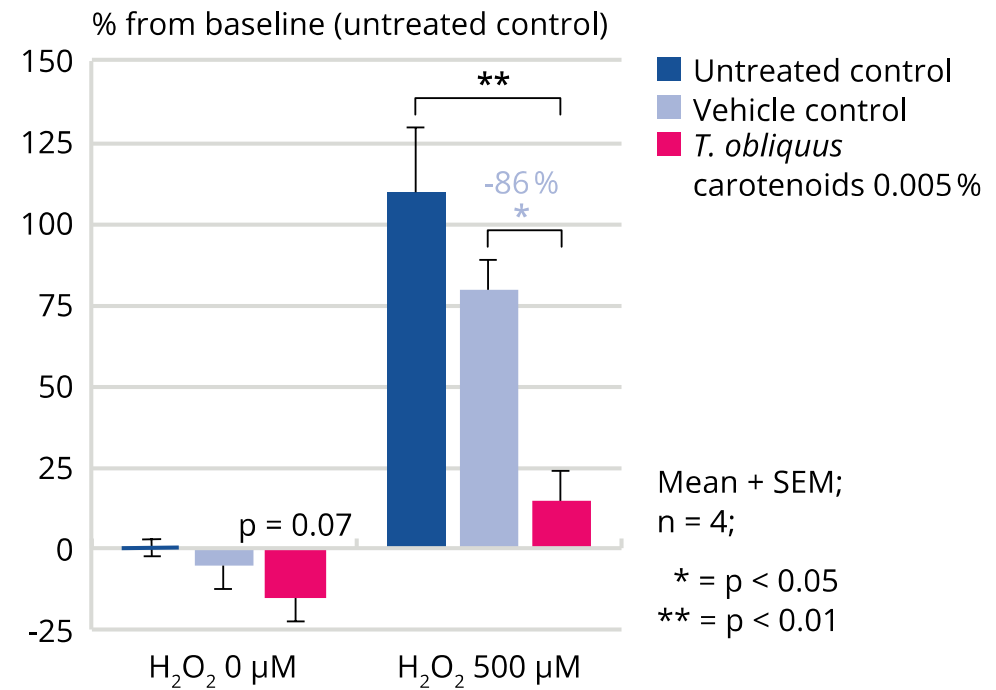
Incubation of HaCaT cells (human keratinocytes) with hydrogen peroxide and *T. obliquus* carotenoids for 20 minutes. Cell staining and quantification.

## RESULTS

Significant reduction in oxidative stress almost back to normal. 0.005 % *T. obliquus* carotenoids correspond to 0.5 % RADICARE<sup>®</sup>-GOLD.

Relieves the cells of oxidative stress

## ROS generation in keratinocytes exposed to H<sub>2</sub>O<sub>2</sub>



# RADICARE<sup>®</sup>-GOLD protects the cells

from the effects of blue light (*in-vitro* study)

## METHOD

Measurement of the intracellular ROS content using fluorescence staining (DCFDA kit).

## IMPLEMENTATION

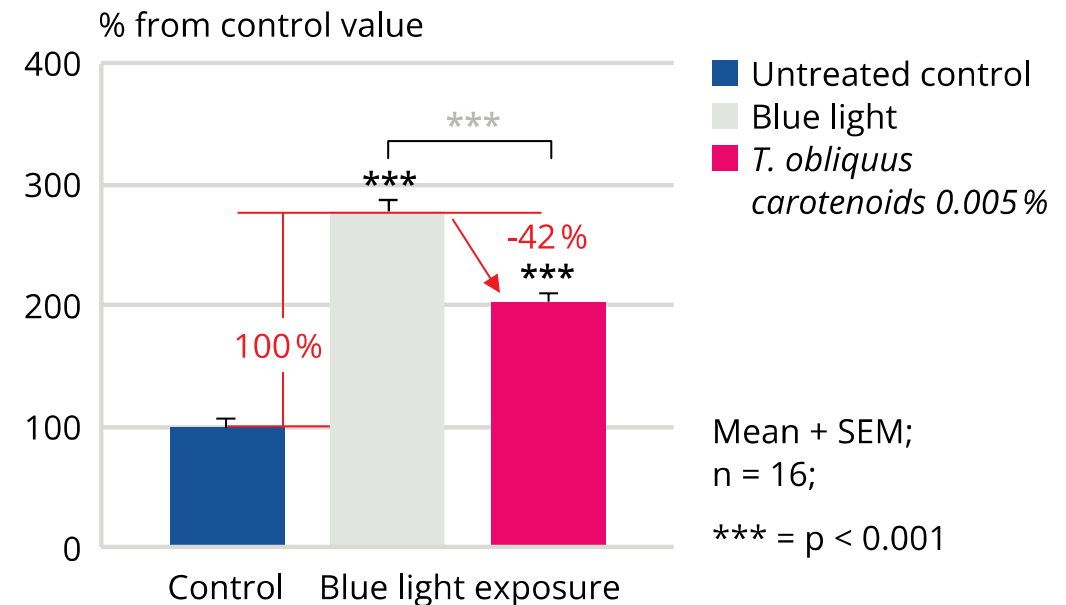
Incubation of HaCaT cells (human keratinocytes) with *T. obliquus* carotenoids and irradiation with 13 J/cm<sup>2</sup> of blue light (470 nm) for 2 hours. Cell staining and quantification.

## RESULTS

Significant reduction in light-induced oxidative stress by 42 %. 0.005 % *T. obliquus* carotenoids correspond to 0.5 % RADICARE<sup>®</sup>-GOLD.



### Blue light-induced ROS generation



Protects cells from the effects of blue light



# RADICARE<sup>®</sup>-GOLD protects the cells

from the effects of WiFi radiation (*in-vitro* study)

## METHOD

Measurement of the intracellular ROS content using fluorescence staining (DCFDA kit).

## IMPLEMENTATION

Incubation of HaCaT cells (human keratinocytes) with *T. obliquus* carotenoids and irradiation with WiFi radiation for 5 hours. Cell staining and quantification.

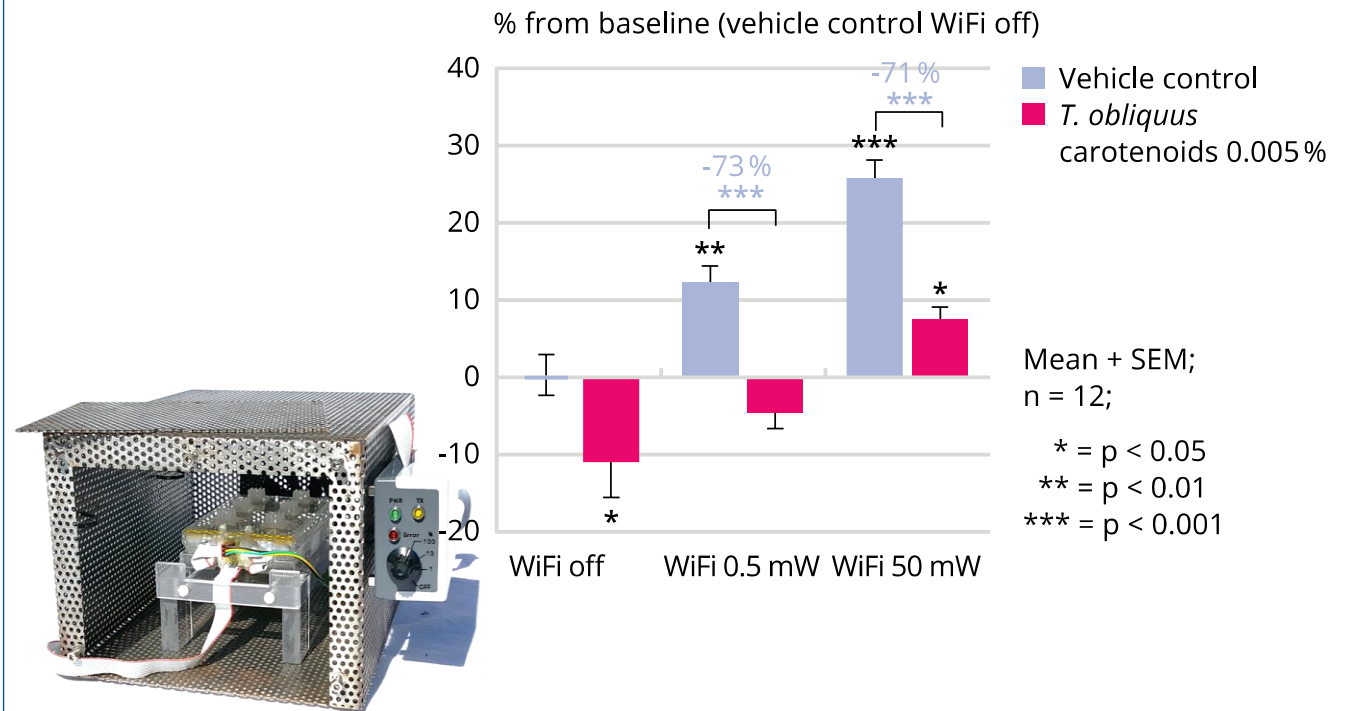
## RESULTS

Significant reduction in WiFi-induced oxidative stress by up to 73 %. 0.005 % *T. obliquus* carotenoids correspond to 0.5 % RADICARE<sup>®</sup>-GOLD.



Protects cells from the effects of WiFi radiation

## WiFi-induced ROS generation



# RADICARE<sup>®</sup>-GOLD protects the cells

from intense oxidative stress (*in-vitro* study)

## METHOD

Measurement of lipid peroxidation using epifluorescence microscopy (Image-iT<sup>®</sup> kit)

## IMPLEMENTATION

Incubation of human dermal fibroblasts with *T. obliquus* carotenoids and cumene hydroperoxide for 30 minutes. Cell staining and quantification.

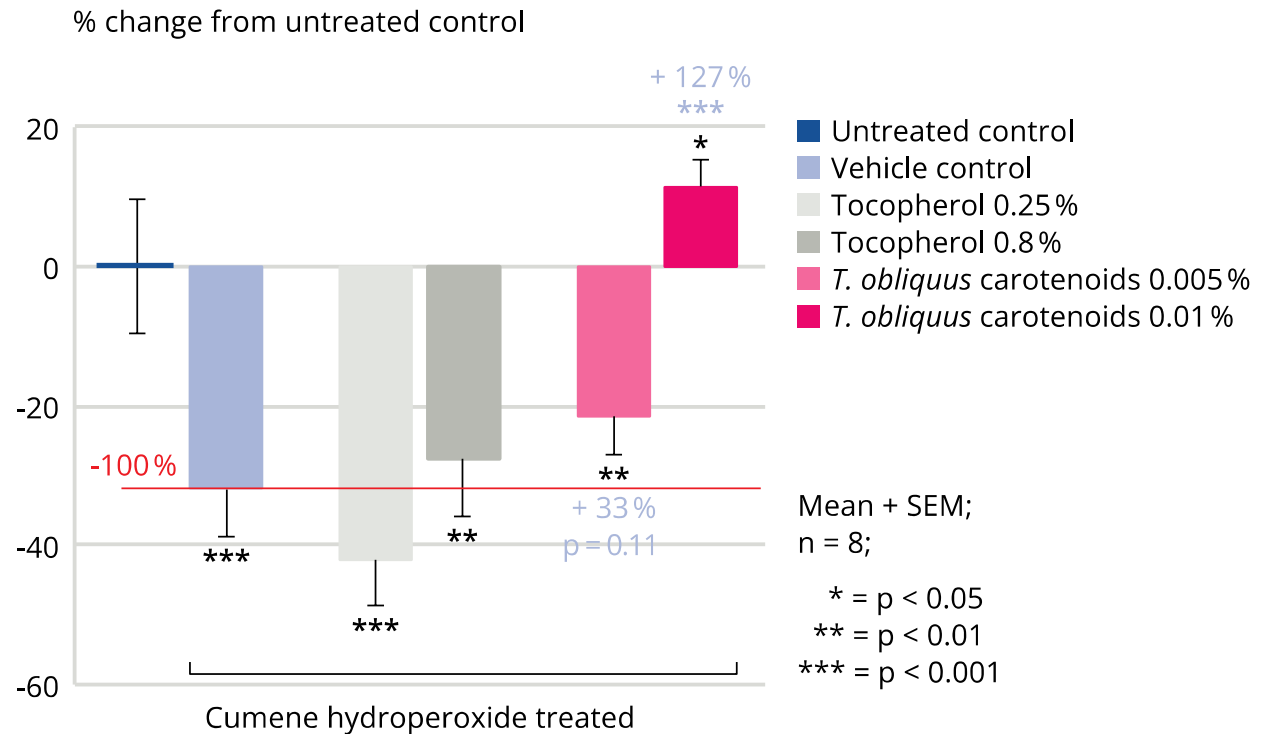
## RESULTS

Significant protective effect of +127 % compared to vehicle. 0.005 % *T. obliquus* carotenoids correspond to 0.5 % RADICARE<sup>®</sup>-GOLD.



Protects the cells from oxidative stress

## Protection against lipid peroxidation

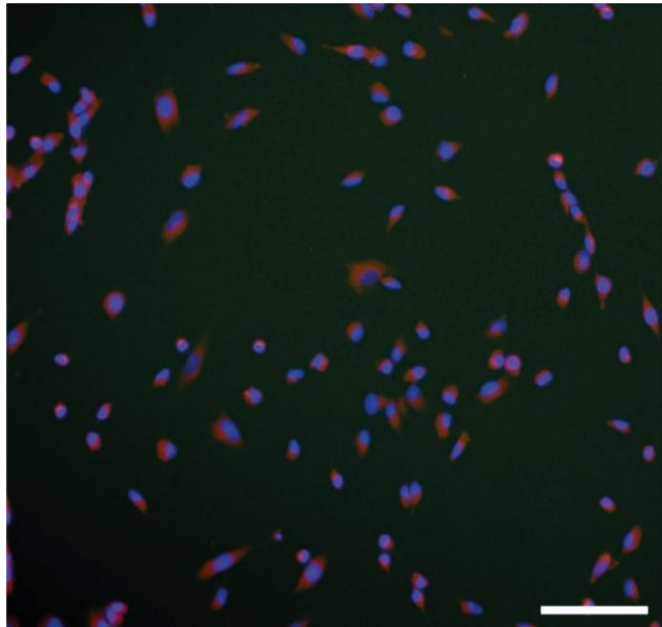


# RADICARE<sup>®</sup>-GOLD protects the cells

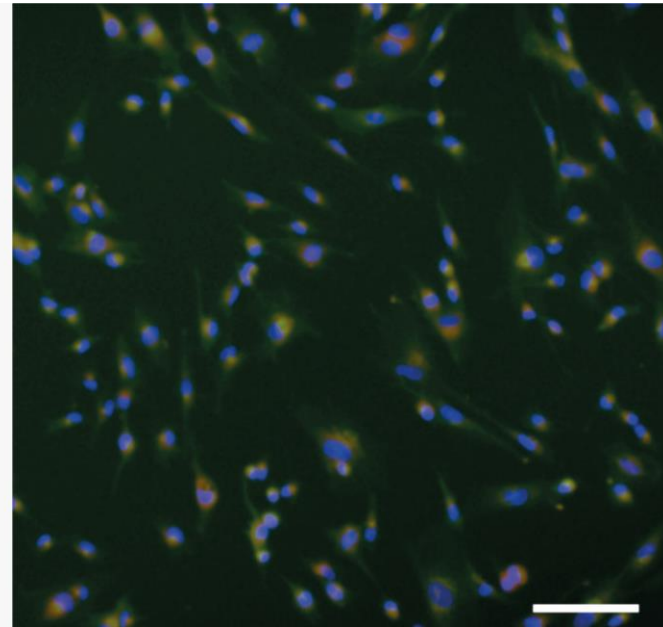
from intense oxidative stress (*in-vitro* study)

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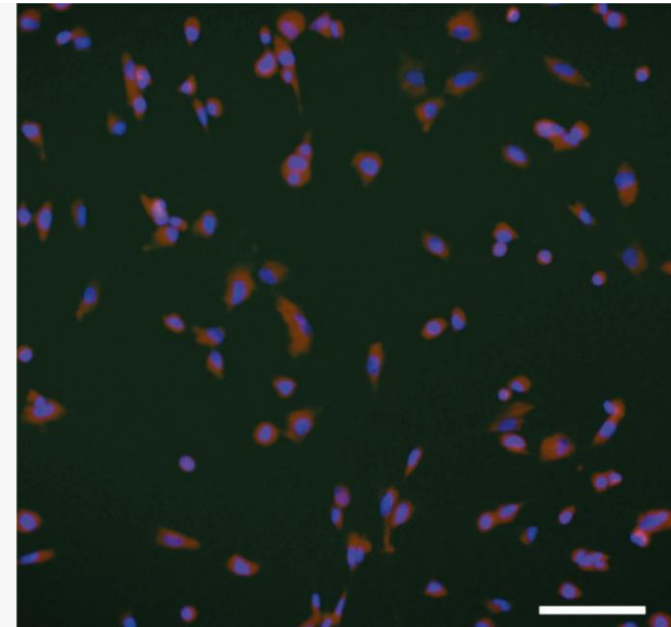
Fibroblasts stained for lipid peroxidation (red = no lipid peroxidation; green = strong lipid peroxidation)



Vehicle control



Cumene hydroperoxide 100 μM



Cumene hydroperoxide 100 μM  
+ *T. obliquus* carotenoids 0.01 %



# RADICARE<sup>®</sup>-GOLD revitalises

the epidermis (*in-vitro* study)

## METHOD

Measurement of lateral keratinocyte proliferation using the scratch test. Analysis using IncuCyte<sup>®</sup> HD recordings.

## IMPLEMENTATION

Incubation of HaCaT cells (human keratinocytes) with RADICARE<sup>®</sup>-GOLD for 48 hours. Microscopic images in brightfield.

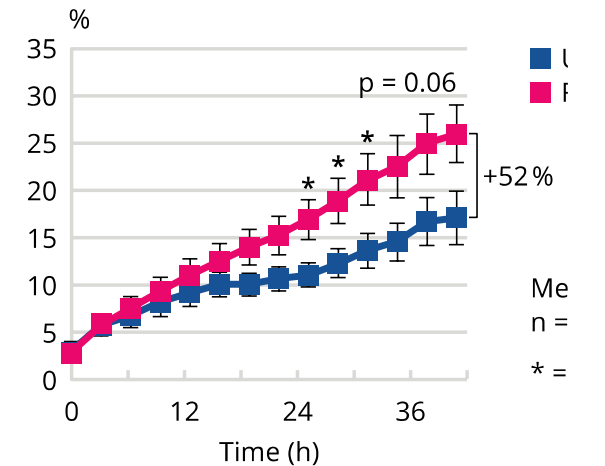
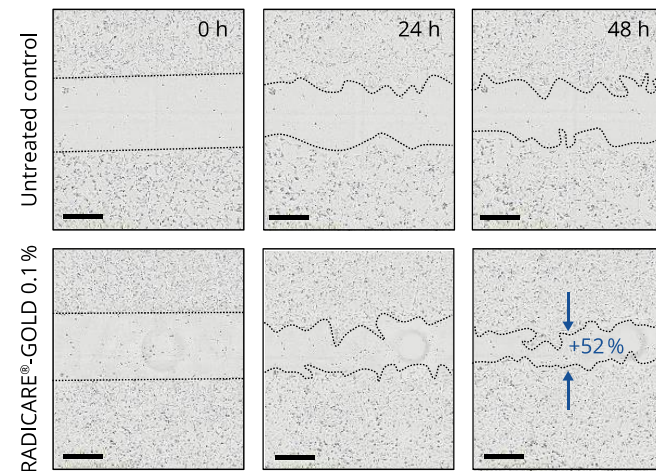
## RESULTS

Significantly faster regeneration of the gap by 52 %.



Revitalises the epidermis

## Degree of confluence (wound healing)



Mean ± SEM; n = 6; ■ Untreated control  
■ RADICARE<sup>®</sup>-GOLD 0.1 %

\* = p < 0.05

## Disclaimer

### Presentation RADICARE® GOLD Version January 2024

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