IFF | LUCASMEYER COSMETICS

MELINOIL™

UNIQUE OIL-SOLUBLE SKIN PHOTOPROTECTION

MELINOIL™
Unique Oil-Soluble Skin Photoprotector

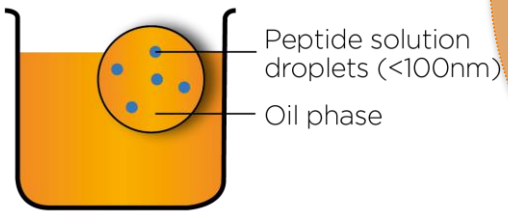
Triple action for maximal sun protection

Stimulates the natural skin photoprotection system:

- **Increases skin pigmentation**
- **Protects and repairs DNA**
- **Reduces sun-induced erythema**

Origin

- Patented α-MSH biomimetic peptide
- Innovative **oil-soluble form** (W/O microemulsion)



Multifunctional active

- ↑ tyrosinase activity, ↑ melanin production, ↑ melanocyte dendricity
- Decreases the formation of DNA UV-induced damages
- Reduces the production of inflammatory mediators

Consumer Benefits

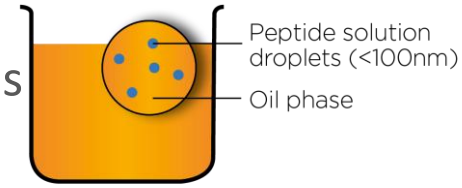
- Limits photoaging and premature aging
- Reduces skin redness
- Soothes sun-ravaged skin
- Provides a sun-kissed glow for healthy-looking skin

Manufacturer Benefits

- **Introduction in oil-based products** and emulsions (sun care & anti-aging)

LMC PROPRIETARY LIPOPHILIZATION TECHNOLOGY

Transparent and **stable** W/O microemulsion of a peptide (hydrosoluble molecule) solution in an oil using phospholipids as the emulsifying system => **Ultrasmall droplets** (<100 nm).



This know how is based on 3 expertises:

- Calibrated selection of phospholipids
- Specific ratio Water/Oil/Phospholipids
- Optimized emulsification process (low shear rate, specific time)

Big size droplets

W/O emulsion
Droplet size app. 10µm = 10000nm
=> 100x bigger than in MelinOIL™

Phospholipid or water excess

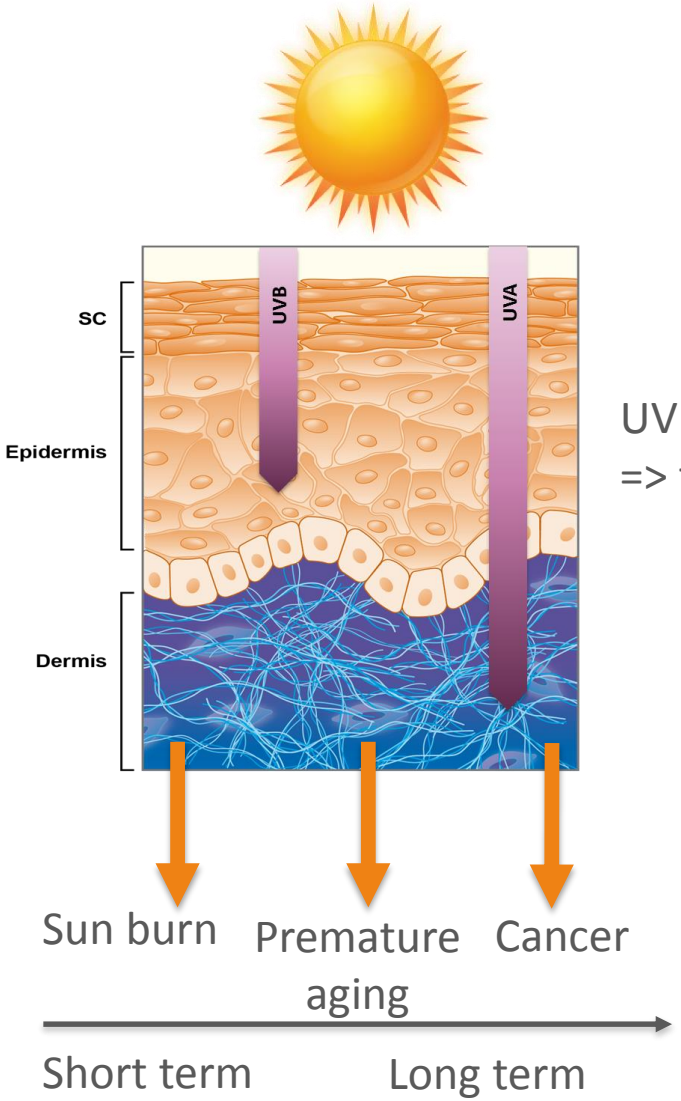
After shaking At rest

W/O emulsion
Non homogenous dispersion of ultrasmall droplets (<100 nm)

MelinOIL™
=> Perfect transparency

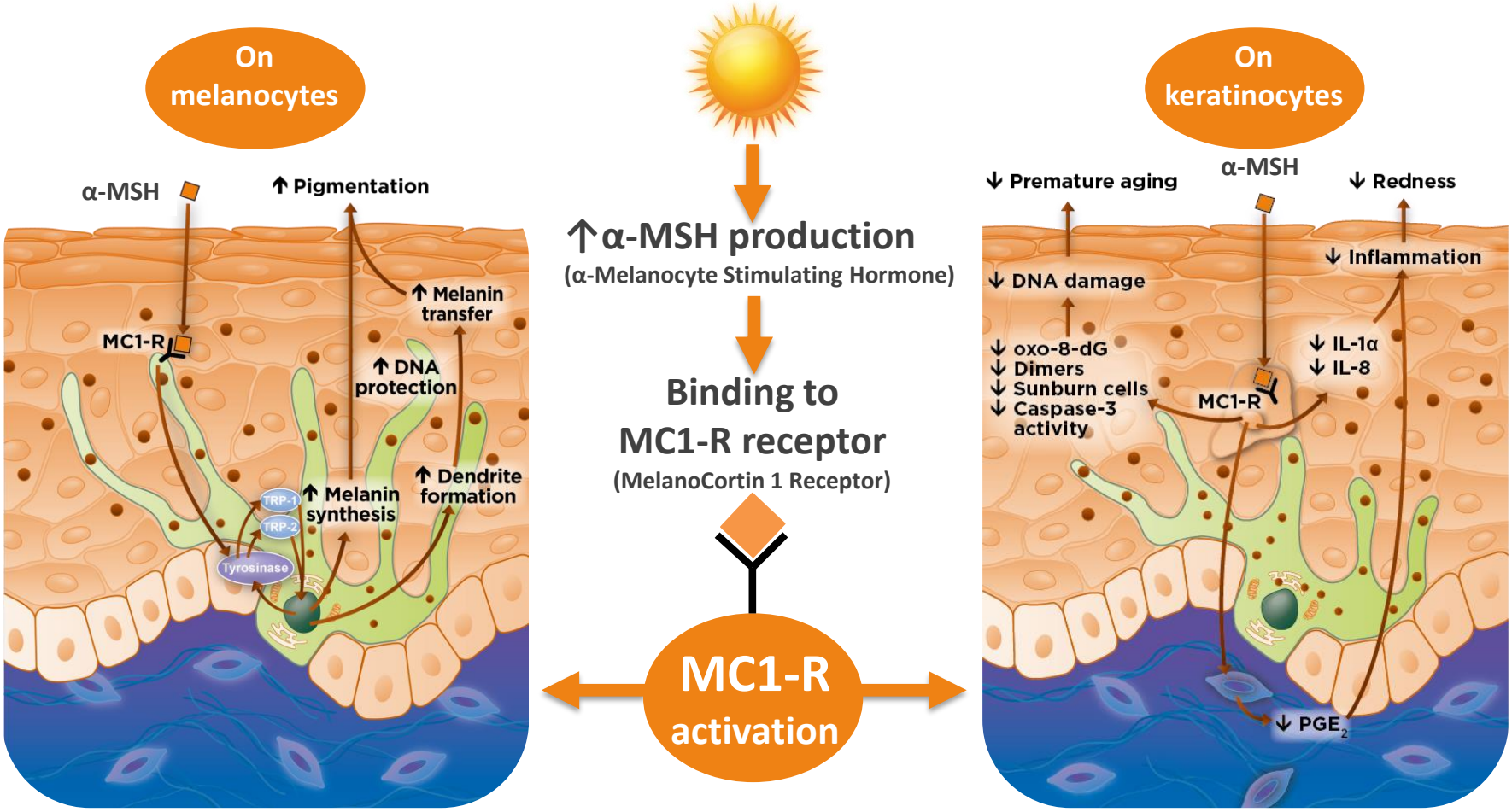
W/O emulsion
Homogeneous dispersion of ultrasmall droplets (<100 nm)

WHY ARE UV RAYS HARMFUL FOR THE SKIN?



UV are high energy rays penetrating skin
=> they damage skin at different levels

NATURAL SKIN PHOTOPROTECTIVE SYSTEM



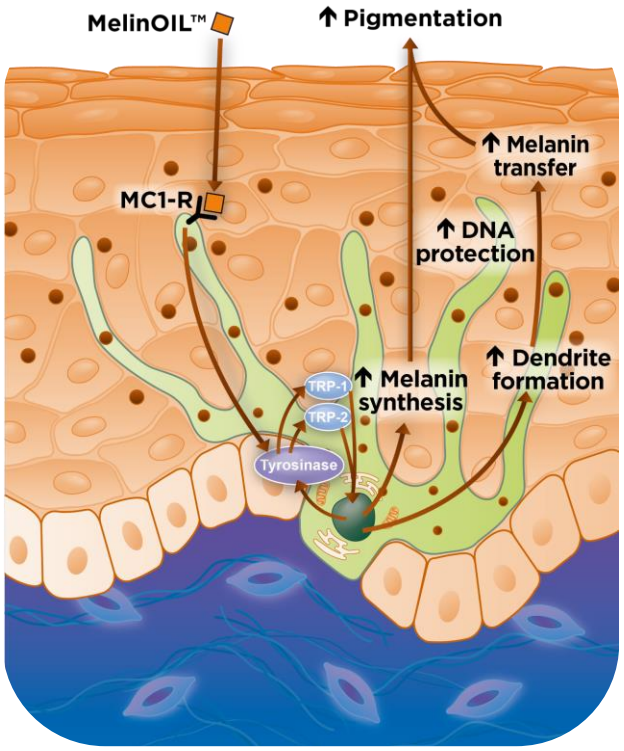
Skin pigmentation

DNA repair mechanism

Anti-inflammatory action

MELINOIL™: A TRIPLE ACTION

On melanocytes

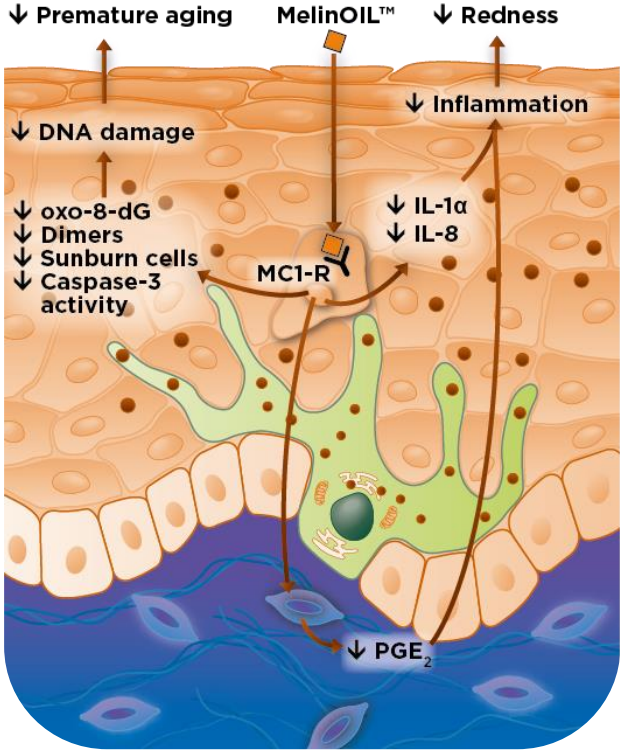


MELINOIL™

Binding to MC1-R receptor

MC1-R activation

On keratinocytes

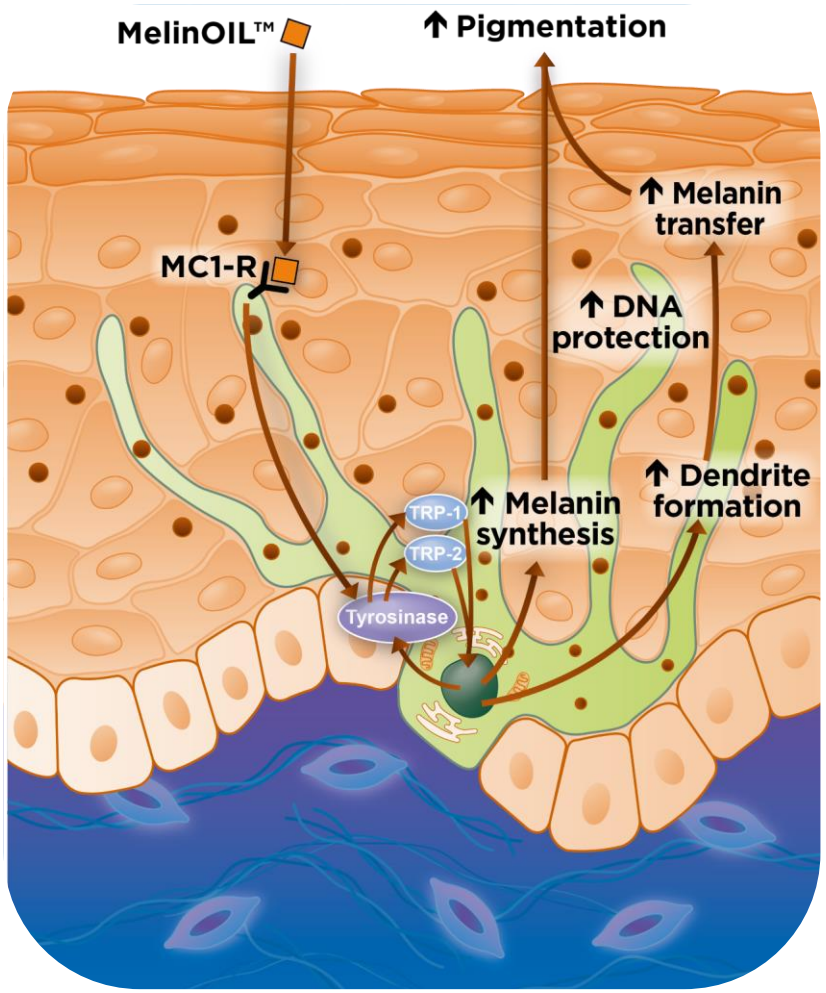


1 Skin pigmentation

2 DNA repair mechanism

3 Anti-inflammatory action

1 STIMULATION OF PROTECTIVE PIGMENTATION



MELINOIL™

Activates tyrosinase activity

↓

Increases melanin production in melanocytes

Improves the formation of dendrite

↓

Improves transfer of melanin from melanocytes to keratinocytes

↓

Enhances pigmentation (faster & long-lasting)

↓

Protects the deeper layers of skin from the UV effects

Stimulation of Tyrosinase activity & Melanin synthesis

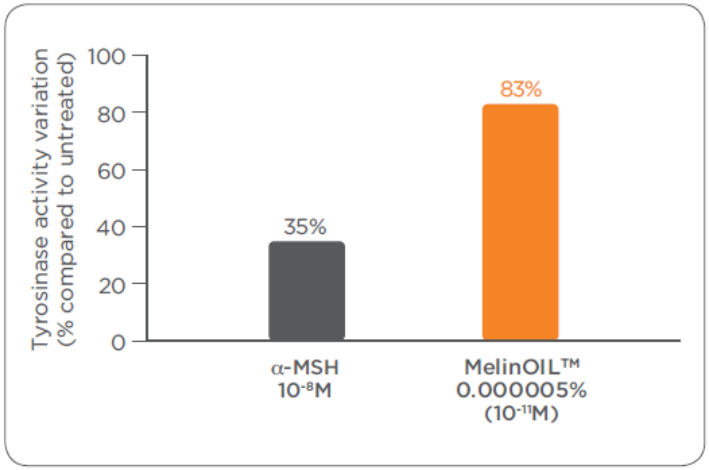
1

In vitro test protocol

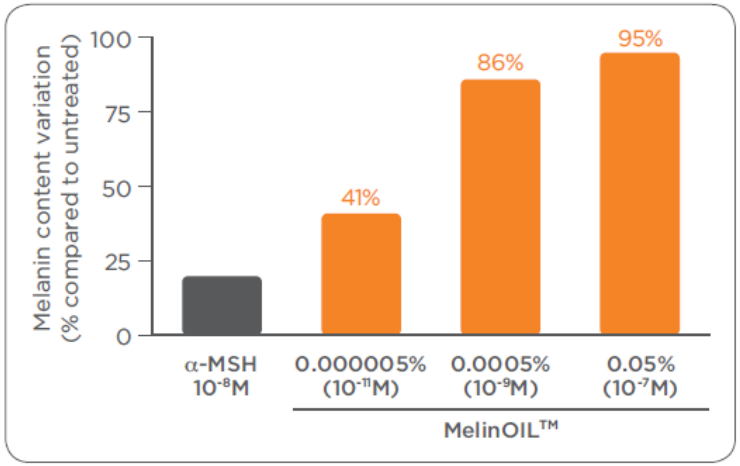
- MelinOIL™ or α-MSH was added to melanocyte culture
- Measurement of tyrosinase activity (following L-DOPA content)
- Measurement of melanin content with spectrophotomete

Tyrosine $\xrightarrow{\text{Tyrosinase}}$ L-DOPA - - - - → Melanin

Evaluation of tyrosinase activity



Evaluation of melanin synthesis



MelinOIL™ stimulates tyrosinase activity & melanin production increasing the natural skin photoprotection

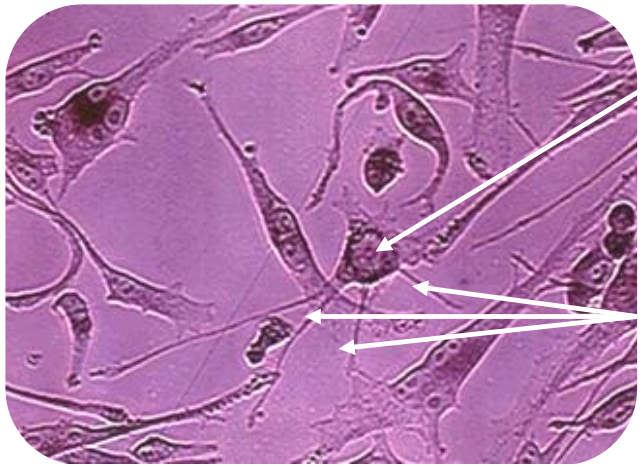
IMPROVEMENT OF MELANIN TRANSFER

In vitro test protocol

- MelinOIL™ 0.05% was added to human melanocyte culture during 24h
- Microscopic observations

Untreated

MelinOIL™

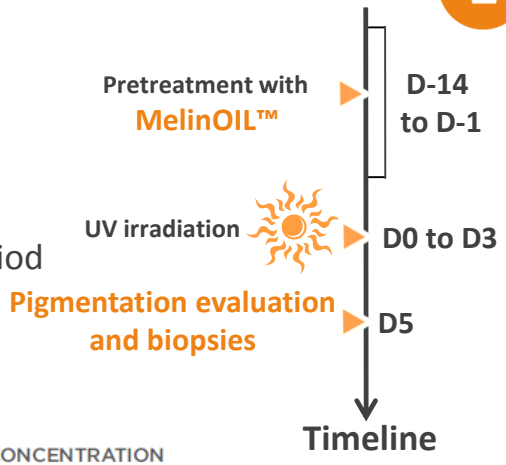


Larger cell bodies = ↑melanin synthesis

More dendrites = Better transfer of melanosomes (melanin) to keratinocytes

MelinOIL™ improves the formation of dendrites facilitating the transfer of melanin from melanocytes to keratinocytes for a better photoprotection

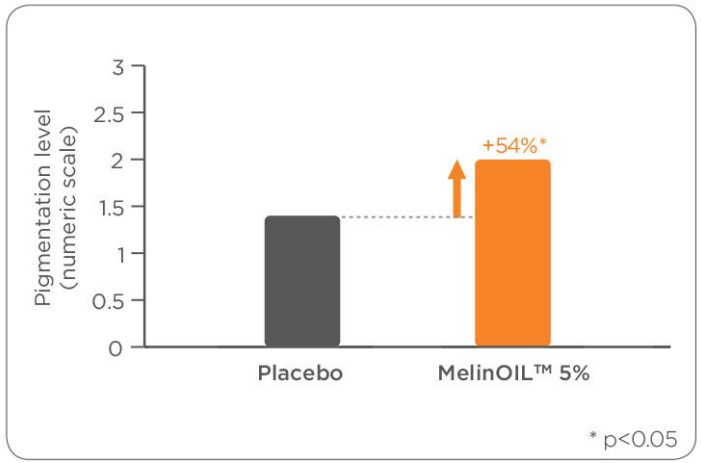
Clinical efficacy on pigmentation



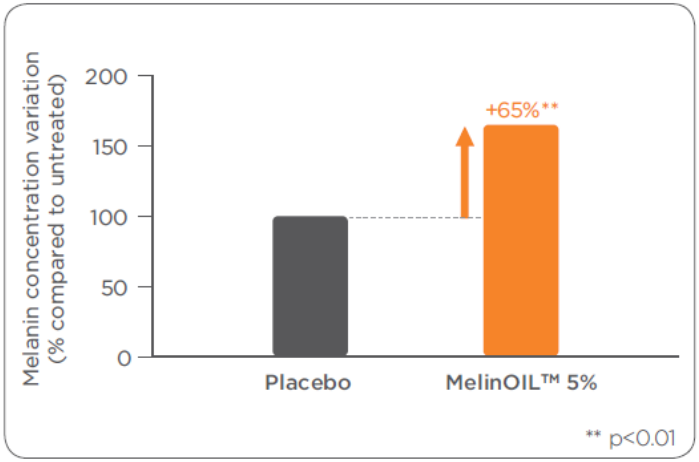
In vivo test protocol

- 12 healthy volunteers (phototypes III and IV)
- Application of 5% MelinOIL™ on forearm 2X/Day for a 2 weeks pretreatment period
- UV irradiation (0.6 MED) for 4 days
- Clinical evaluation of skin pigmentation by a dermatologist (scorage 0 to 5)
- Quantification of melanin content by image analysis of biopsies

Evaluation of skin pigmentation



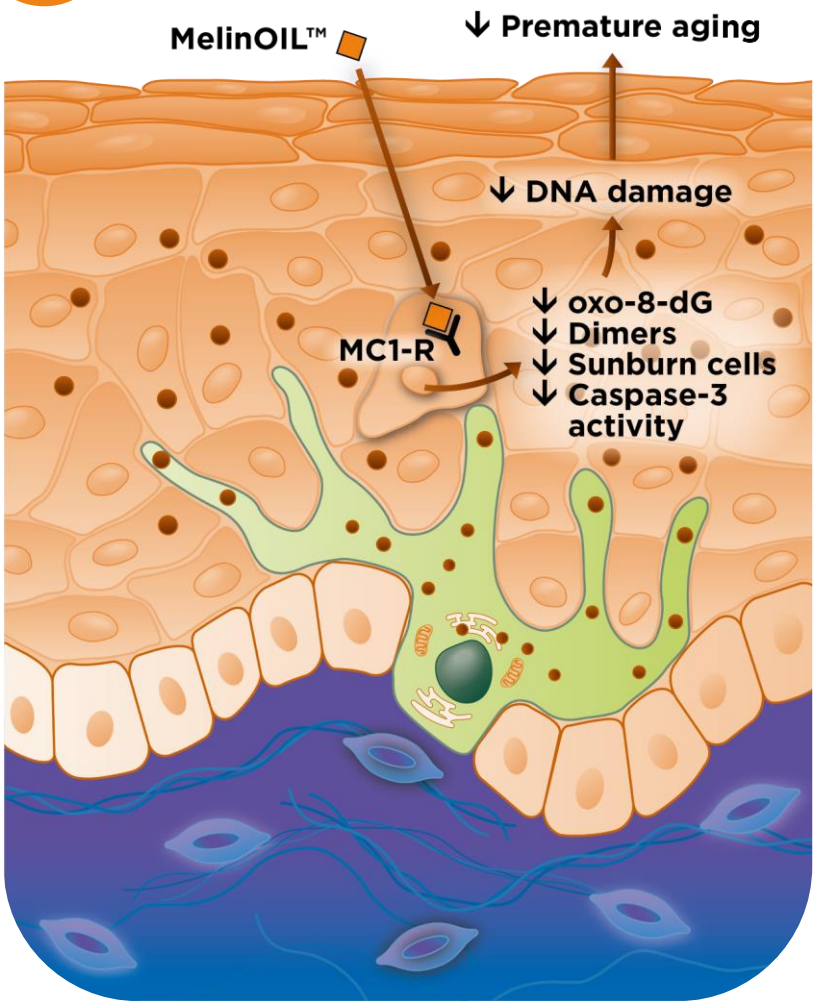
Evaluation of melanin concentration



Tested formula: Water 97.8%, 10 ppm pure peptide (eq. MelinOIL™ 5%), Carboxymethylcellulose 2%, Phenonip 0.2%

MelinOIL™ increases melanin production & skin pigmentation for better natural photoprotection

2 DNA Protection & Repair



MELINOIL™

Protects DNA from UV damages

Repairs DNA UV-induced damages

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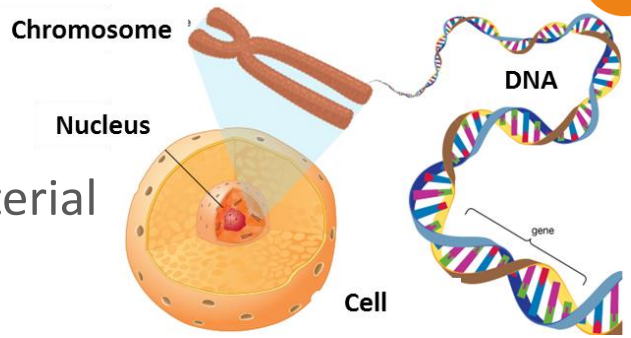
Decreases sunburn cells (cell death)

↓

Limits photo-aging
&
Prevents premature aging

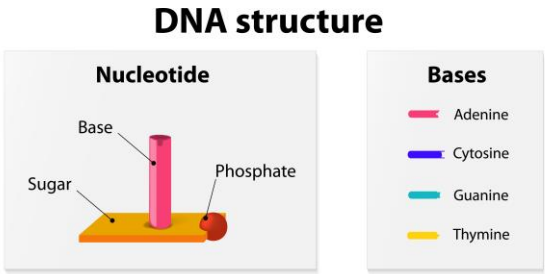
DNA

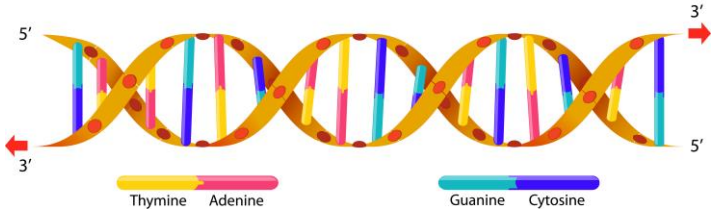


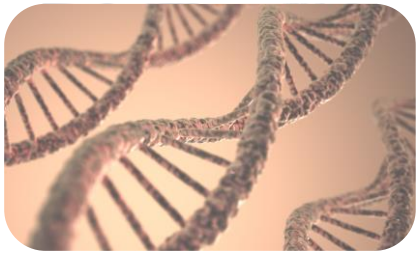
- DNA (Deoxyribonucleic Acid) is the genetic material located in cell nucleus as a double helix form

- Nucleotides are building block of DNA and are always linked in pair (purine with pyrimidine) which connects the complementary strands of DNA.

4 nucleotide bases	
Purines	Pyrimidines
A (adenine)	T (thymine)
G (guanine)	C (cytosine)





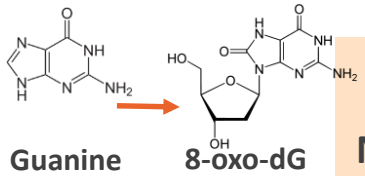


DNA UV-induced damages

UVA

Indirect action

Free radicals formation



DNA Damage

Nucleotide oxidation

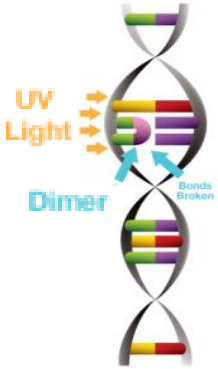
UVB

Direct action

Absorption by DNA

DNA Damage

Pyrimidine dimers (CPDs)



Proper Repair

few seconds for UVA damages
30 minutes for UVB damages

Accumulation

Photoaging
Skin redness

Improper Repair

Mutation

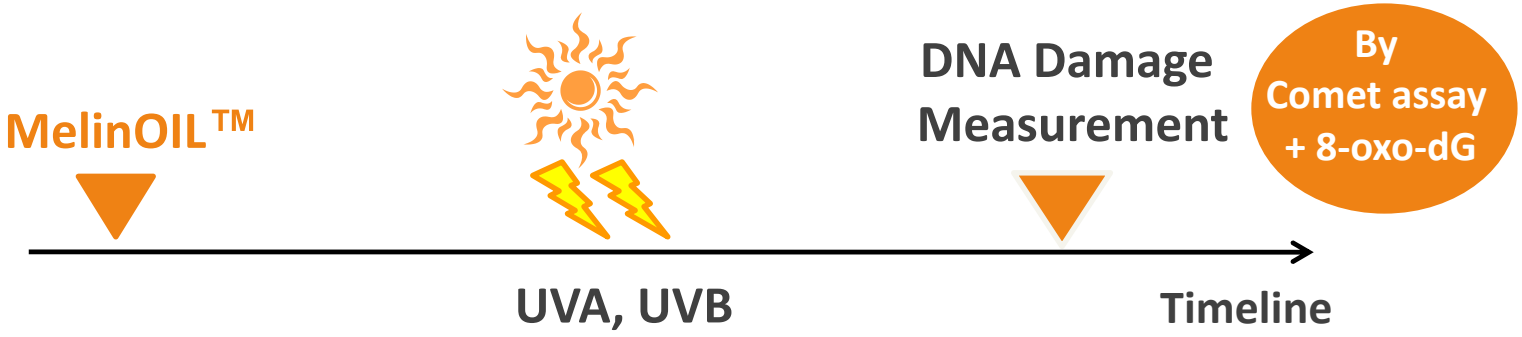
Release of caspase-3

Apoptosis (cell death) = Sunburn cells

Cancer risk

DNA Protection & Repair

Protection = Preventive action

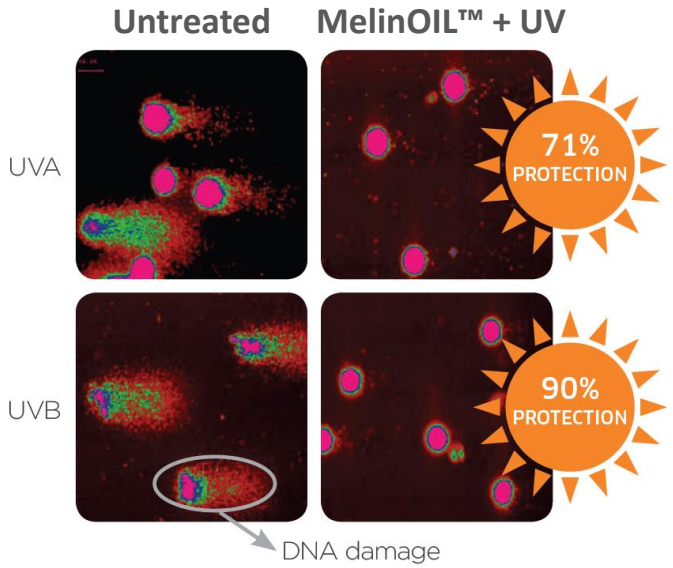


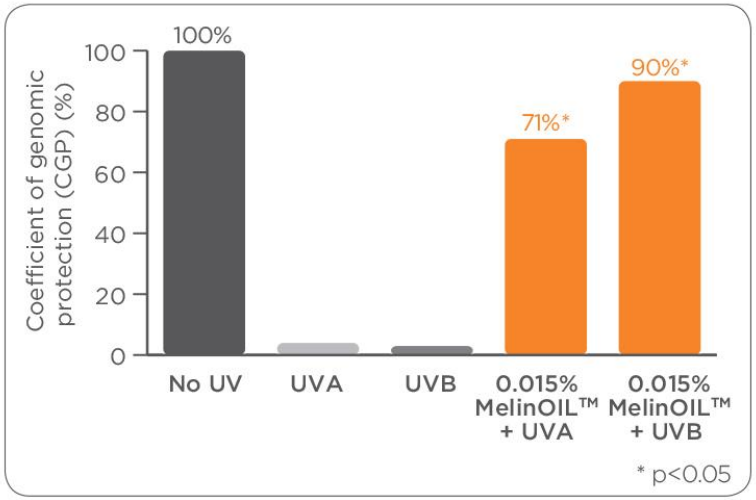
Repair = Curative action

DNA PROTECTION AGAINST UVA & UVB (COMET ASSAY)

In vitro test protocol

- 0.015% MelinOIL™ is added to human melanocytes for 2 hours
- UVA (365 nm, 0.8 J/cm2) or UVB (312 nm, 0.06 J/cm2) radiations
- DNA staining and image analysis by fluorescence microscopy
- Calculation of coefficient of genomic protection (CGP) by measurement of tail length



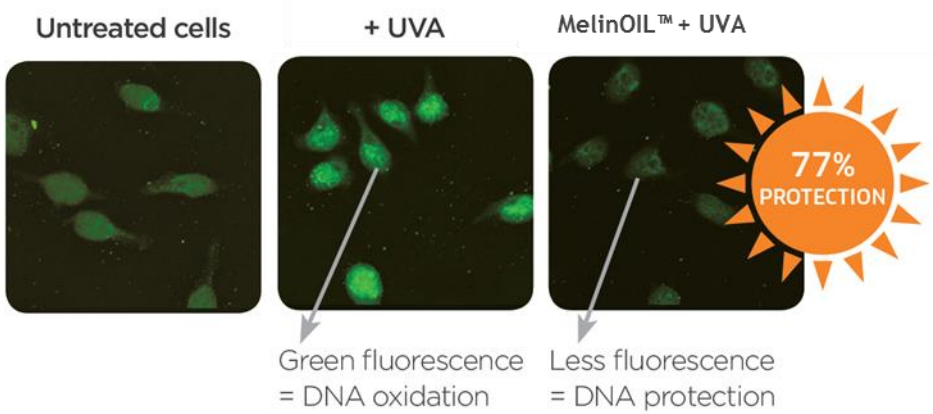


MelinOIL™ has a preventive action on DNA damage induced by UVA or UVB radiations

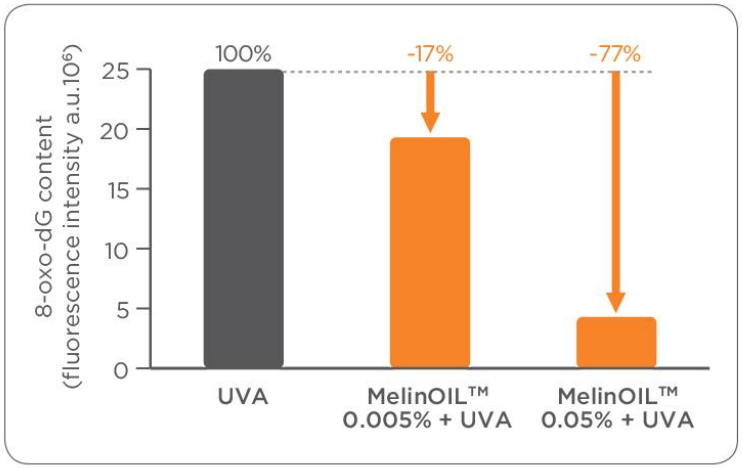
DNA PROTECTION AGAINST UVA (8-OXO-DG)

In vitro test protocol

- 0.015% MelinOIL™ is added to human melanocytes for 2 hours
- 0.005% and 0.05% MelinOIL™ is added to keratinocyte culture for 24 hours
- UVA (15J/cm2) irradiation for 50-60 min
- Staining and quantification of 8-oxo-dG (8-oxo-desoxyguanosine) (major DNA lesions induced by UVA)



EVALUATION OF DNA PROTECTION FROM UVA-INDUCED FREE RADICAL DAMAGE

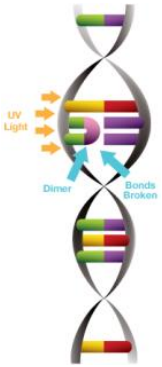


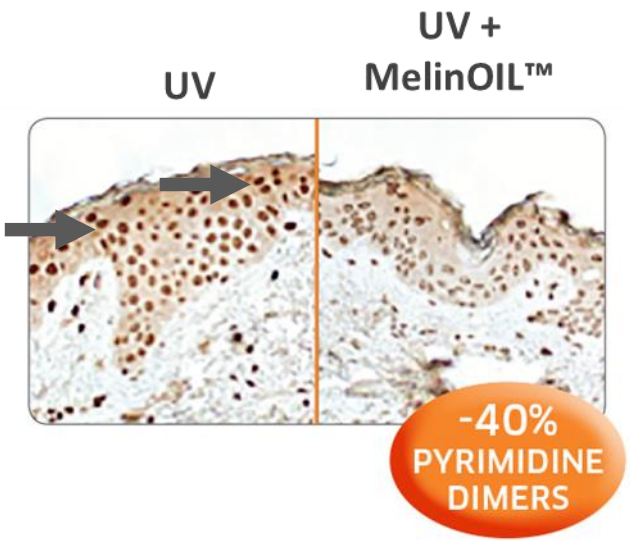
MelinOIL™ protects DNA from UVA-induced free radicals damages

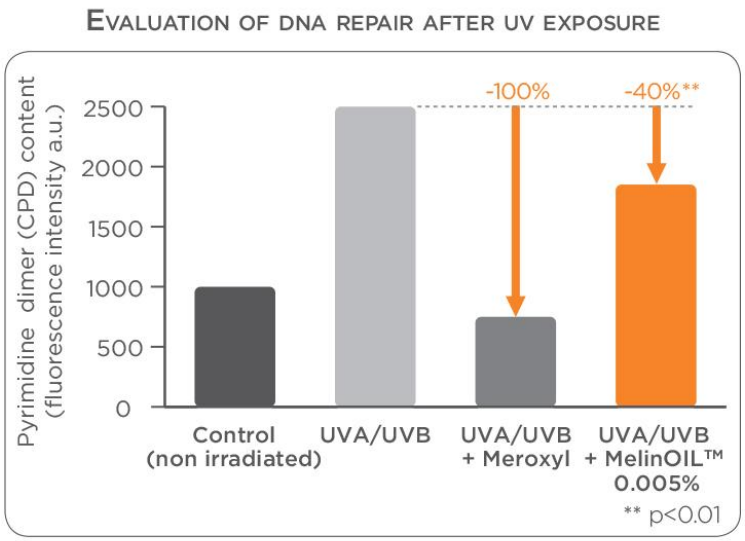
DNA REPAIR AFTER UV-INDUCED DAMAGE

Ex vivo test protocol

- Human skin explants exposed to UVA (50 J/cm²) & UVB (500 mJ/cm²) to generate damage
- A product with Mexoryl filter (SPF 50) is applied on a skin explant as protection reference (optimal skin protection)
- Application of gel containing 0.005% MelinOIL™ during 6 hours
- Quantification of Cyclobutane Pyrimidine dimers (CPD) by image analysis (major DNA lesions induced by UVB)





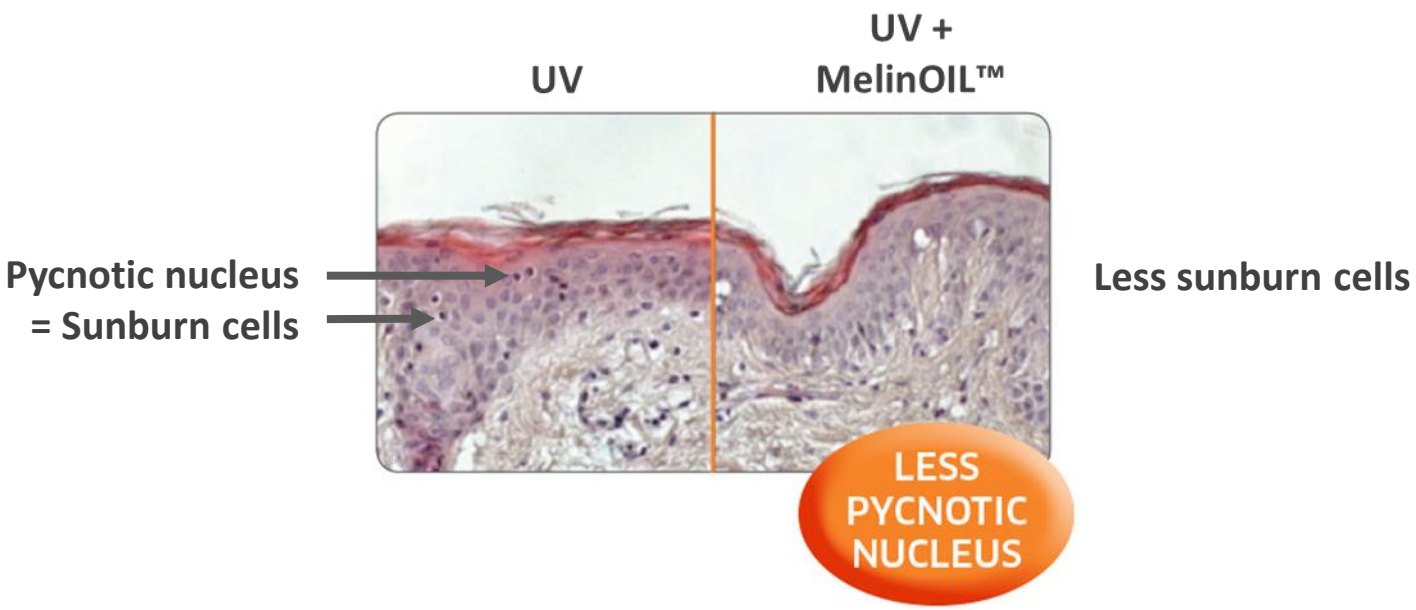


MelinOIL™ reduces the formation of pyrimidine dimers attesting its DNA repair action after UV exposure

DNA REPAIR AFTER UV-INDUCED DAMAGE

***Ex vivo* test protocol**

- Human skin explants exposed to UVA (50 J/cm^2) & UVB (500 mJ/cm^2) to generate damage
- A product with Mexoryl® sunscreen (SPF 50) is applied on a skin explant as an optimal skin protection reference
- Application of a gel containing 0.05% MelinOil™
- Quantification of Sunburn Cells (apoptotic cell after UV irradiation that irreversibly and severely damaged their DNA)

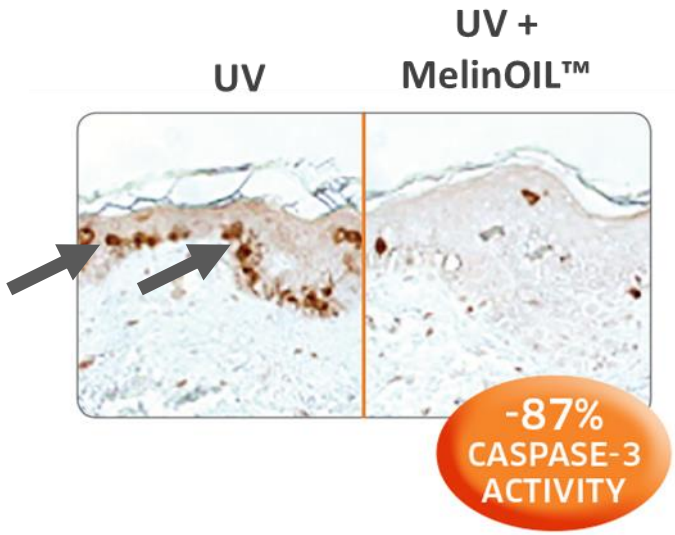


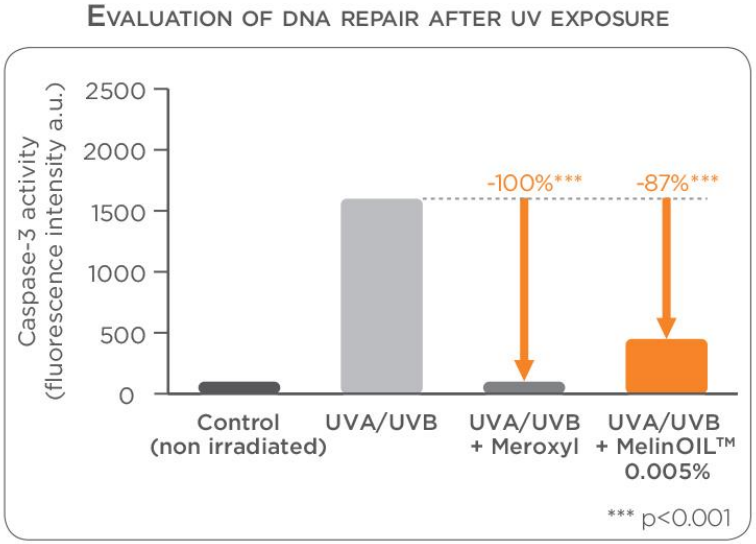
MelinOIL™ reduces the number of sunburn cells attesting its DNA repair action after UV exposure

DNA REPAIRING AFTER UV-INDUCED DAMAGE

Ex vivo test protocol

- Human skin explants exposed to UVA (50 J/cm²) & UVB (500 mJ/cm²) to generate damage
- A product with Mexoryl filter (SPF 50) is applied on a skin explant as protection reference (optimal skin protection)
- Application of gel containing 0.005% MelinOIL™ for 24 h
- Quantification of caspase-3 activity (enzyme involved in the apoptosis process) by image analysis





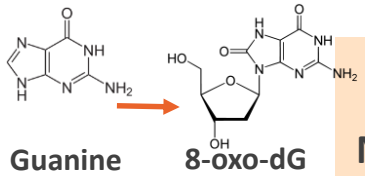
MelinOIL™ reduces the caspase-3 activity attesting its DNA repair action after UV exposure

DNA UV-induced damages

UVA

Indirect action

Free radicals formation



DNA Damage

Nucleotide oxidation

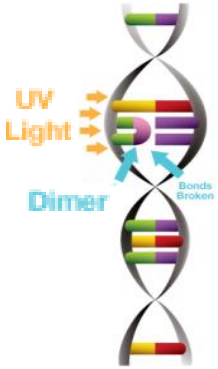
UVB

Direct action

Absorption by DNA

DNA Damage

Pyrimidine dimers (CPDs)



Proper Repair

few seconds for UVA damages

30 minutes for UVB damages

Accumulation

Photoaging

Skin redness

Improper Repair

Mutation

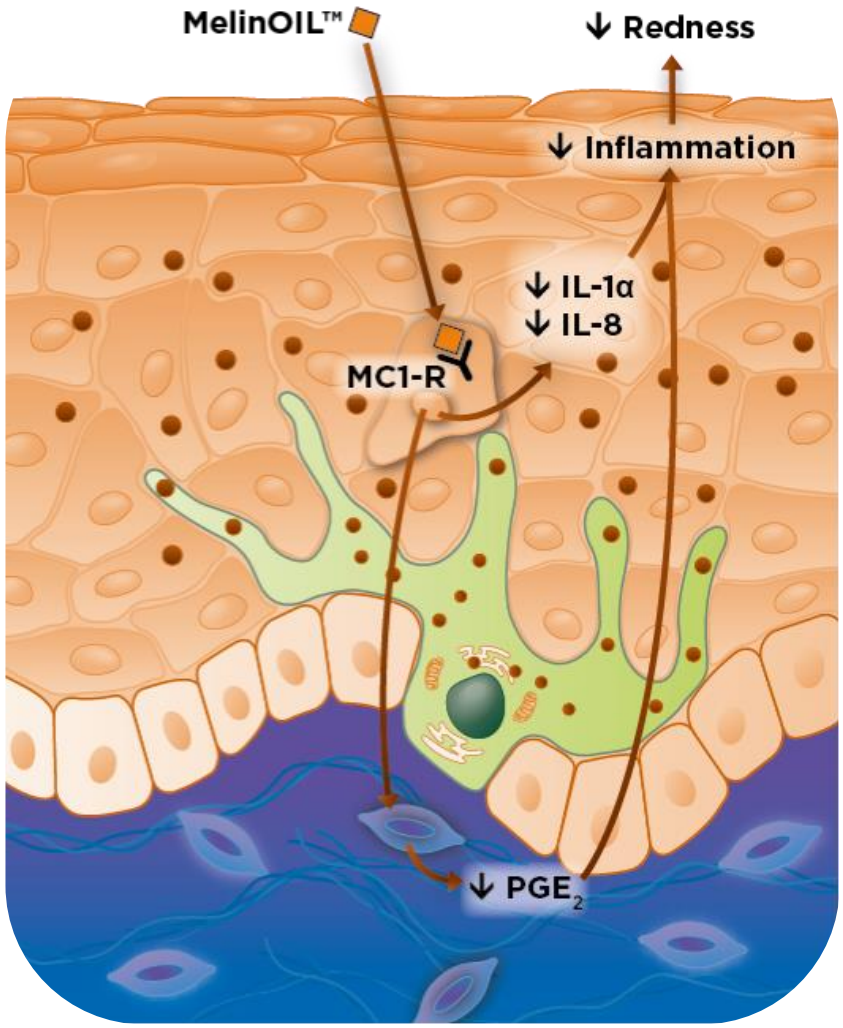
Release of caspase-3

Apoptosis (cell death)

= Sunburn cells

Cancer risk

3 ANTI-INFLAMMATION ACTION



MELINOIL™

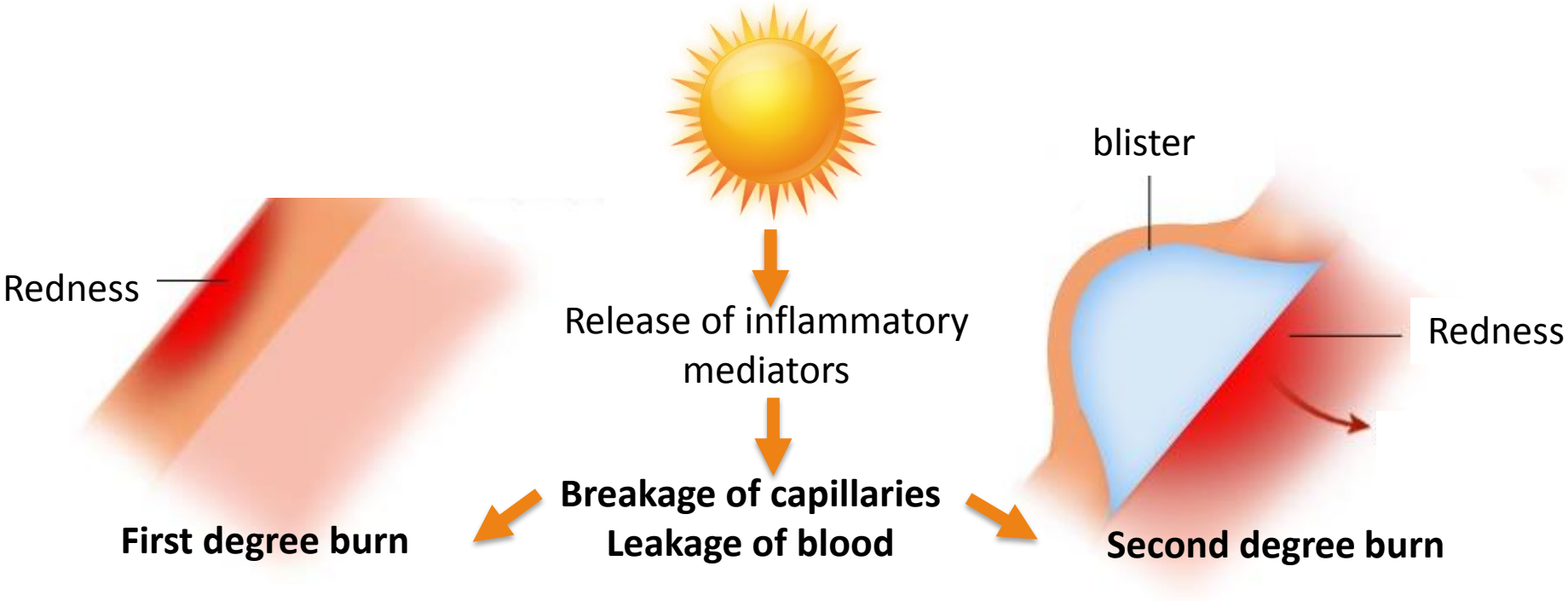
Reduces
pro-inflammatory mediators

↓

Anti-inflammatory
&
Soothing activity

Erythema - Sun Burn

- The ultimate sign of sun over exposure is sun burn !



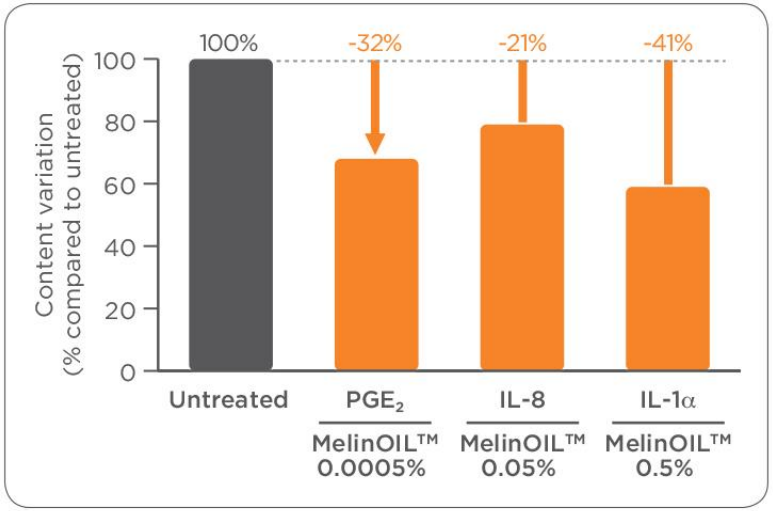
- The UV dose skin can absorb before the apperance of erythema is dependent on sun sensitivity of each person. It can be measured as the Minimal Erythema dose (MED)

INHIBITION OF INFLAMMATORY CYTOKINES

In vitro test protocol

- Keratinocytes were stressed with SDS to induce inflammation => production of IL-1α
- Keratinocytes were exposed with UVB (10 mJ/cm^2) to induce inflammation => production of IL-8 and RANTES
- Fibroblasts were stressed with IL-1α to induce inflammation => production of PGE_2
- MelinOIL™ was added in cell cultures
- PGE_2 was quantified by radio-immuno assay; IL-1α and IL-8 were quantified by ELISA

EVALUATION OF INFLAMMATORY MEDIATOR SYNTHESIS

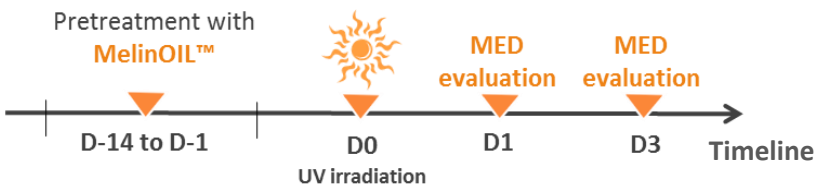


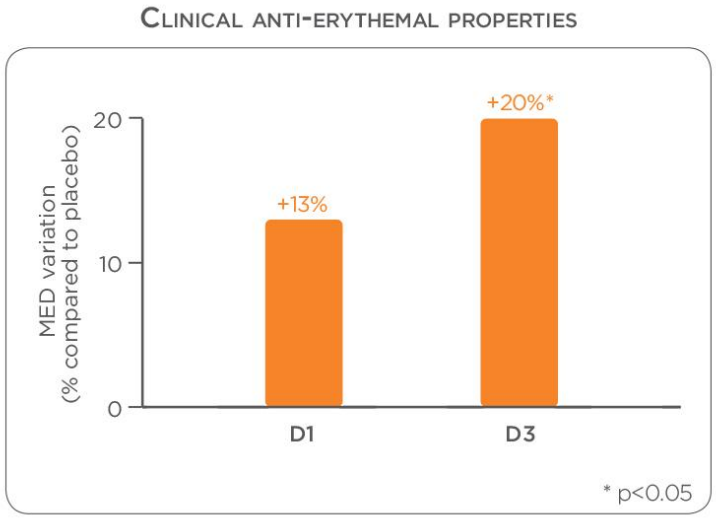
MelinOIL™ clearly reduces the inflammatory cascade

Clinical Efficacy on Skin Redness

In vivo test protocol

- 27 Healthy volunteers (phototypes III and IV)
- Application of a cream with 5% MelinOIL™ or placebo on the inside face of the forearm during a 14 days pretreatment period
- UVA/UVB irradiation at D0 to stimulate the skin photoprotection mechanism
- UVA/UVB irradiation at different doses to determine MED at D1 and D3



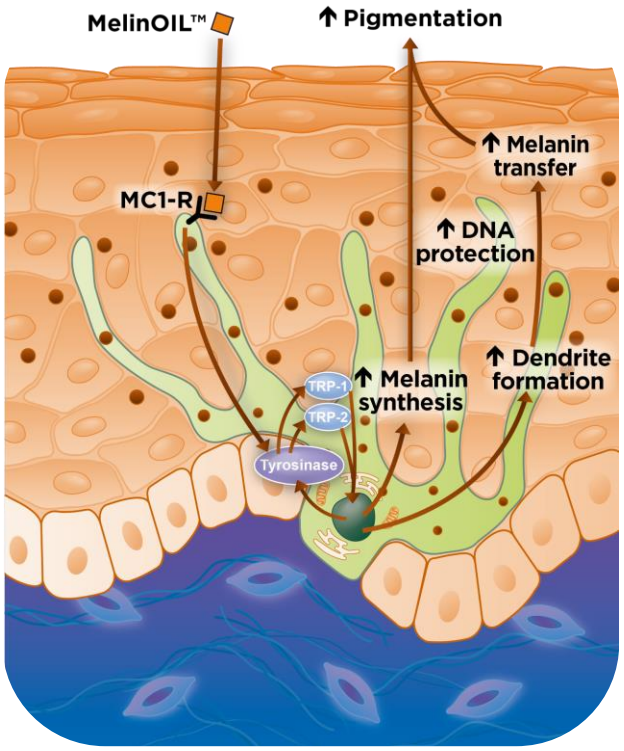


Tested formula: Water 97.8%, 10 ppm pure peptide (eq. MelinOIL™ 5%), Carboxymethylcellulose 2%, Phenonip 0.2%

MelinOIL™ reduces the skin sensitivity to UV-induced erythema

MELINOIL™: A TRIPLE ACTION

On melanocytes

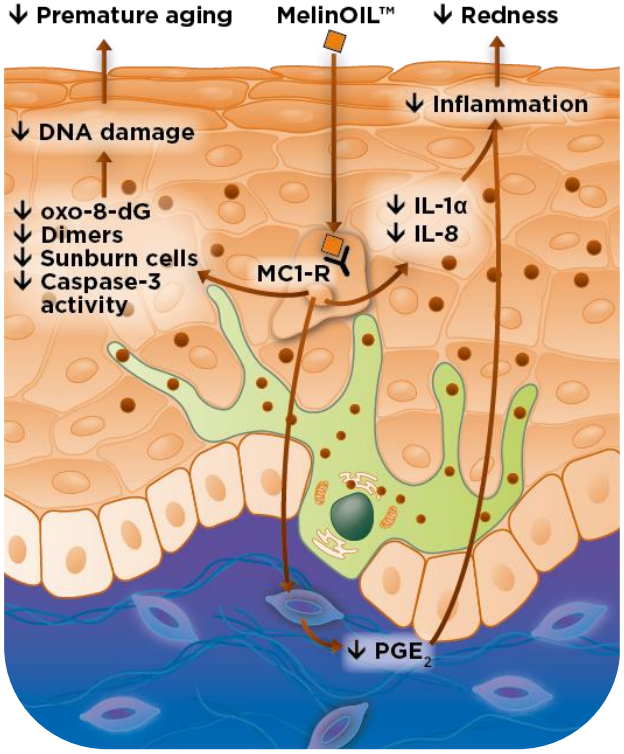


MELINOIL™

Binding to MC1-R receptor

MC1-R activation

On keratinocytes



1 Skin pigmentation

2 DNA repair mechanism

3 Anti-inflammatory action

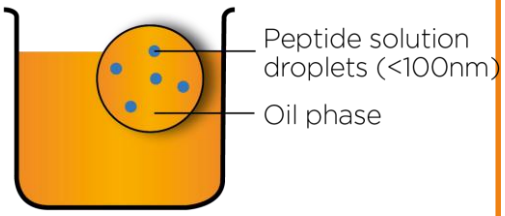
PRODUCT INFORMATION

INCI NAME	Isopropyl Palmitate (and) Lecithin (and) Water (and) Acetyl Hexapeptide-1
ADDITIVE	None
APPEARANCE	Amber transparent liquid
FORMULATION	**For oils**: to be added during the cooling step below 40°C **For emulsions**: to be added during the cooling step below 40°C
DOSAGE	• Protective effect: 0.5-2.5% • Soothing effect: 0.5-5% • DNA protection and repair: 0.5% •Tanning effect : 1-5 %
OPTIMUM PH	4.0-6.0
APPLICATIONS	• Protecting sun care • Tan accelerator • After sun care • Self tanning • Anti-aging care • DD creams • Healthy glow • Soothing care • Anti-gray hair products • Mascara for darker eyelashes

CHINA COMPLIANT **PRESERVATIVE FREE** **ECO-FRIENDLY**

2 VERSIONS

MelinOIL™
Oil-soluble version

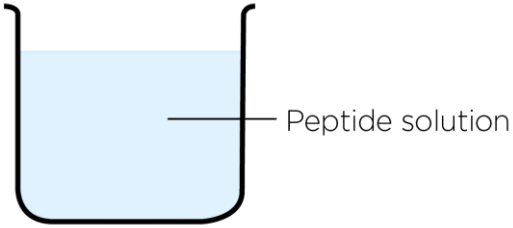


INCI name
Isopropyl Palmitate (and) Lecithin (and) Water (and) Acetyl Hexapeptide-1

Additive
None

Appearance
Amber transparent liquid

Melitane™ GL 200
Water-soluble version



INCI name
Glycerin (and) Water (and) Dextran (and) Acetyl Hexapeptide-1

Additive
None

Appearance
Colourless transparent liquid

Applications & Claims

MelinOIL™
Melitane™

Tan accelerator

- Favors tanning for a faster and more intense result
- Limits photaging

Protective Sun Care

- Enhances natural skin protection
- Protects skin from the appearance of sun burn
- Favors tanning
- Limits photoaging

After Sun Care

- Soothes skin redness & eythema
- Prolongs tan
- Prepares skin for the following day of exposure
- Limits photoaging

Anti-aging care

- Protects skin from successive daily sun exposure
- Provides a natural glow day after day
- Limits photoaging

TOXICOLOGY

- Skin Irritation (48h single patch test) (tested concentration: pure)
- Eye Irritation (HET-CAM) (tested concentration: pure)
- Sensitization (DPRA & KeratinoSens™) (tested concentration: pure) / (H-CLAT) (tested concentration: 5%)
- Mutagenicity (AMES) (tested concentration: pure)
- Phototoxicity (UV spectrum) (Tested concentration: 2%)

ECOTOXICITY

- Biodegradability (OECD 301D)
- Aquatic toxicity:

  - Immobilization test on daphnies (OECD 202)

  - Growth inhibition test on freshwater alga and cyanobacteria (OECD 201)

Excellent safety profile

Features and Benefits

FEATURES	BENEFITS
α-MSH biomimetic peptide	Activates MC1-R on both keratinocytes and melanocytes to stimulate the natural skin photoprotection process.
Triple action - Melanin synthesis - DNA protection & repair - Anti-inflammatory action	Offers an optimal skin bioprotection against UV to limit premature aging.
Clinically effective	Induces pigmentation and reduces redness to decrease skin damage caused by sun overexposure. Provides a sun-kissed glow for healthy-looking skin.
Oil-soluble version	Designed to be formulated in all types of oily products. Can also be introduced in O/W or W/O emulsions.

PROTECTIVE SUN OIL 16.125.05 C173

SPF 10

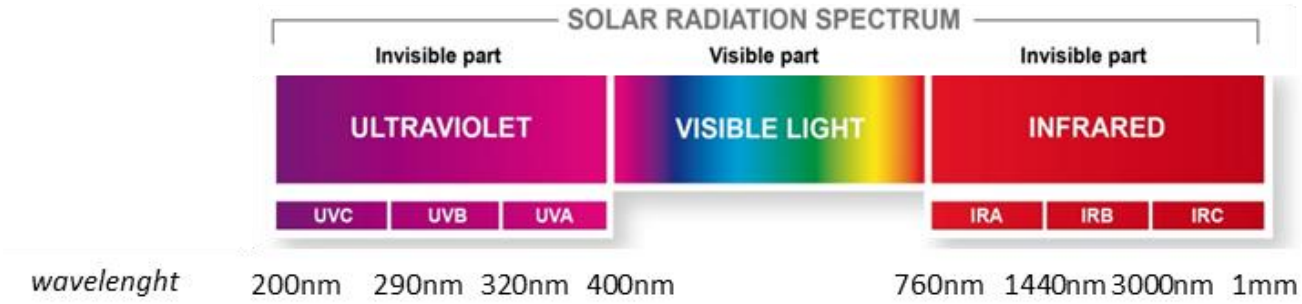
INGREDIENTS	INCI NAMES	%
A Sweet Almond oil	Prunus Amygdalus Dulcis (Sweet Almond) Oil	7.50
SCB Jojoba oil	Simmondsia Chinensis (Jojoba) Seed Oil	15.00
Saboderm TCC	Caprylic/Capric Triglyceride	7.50
Amisol Trio™	Phospholipids (and) Glycine Soja (Soybean) Oil (and) Glycolipids (and) Glycine Soja (Soybean) Sterols	2.00
Dermofeel® TC-7	Triheptanoin	8.90
Schercemol™ CO Ester	Cetyl Ethylhexanoate	35.10
Eusolex™ 9020	Butyl Methoxydibenzoylmethane	3.00
Uvinul® N 539 T	Octocrylene	5.00
Eusolex™ 2292	Ethylhexyl Methoxycinnamate	5.00
Eusolex™ OS	Ethylhexyl Salicylate	5.00
B Solaire 1	Fragrance	0.80
Vitapherole® E1000	Tocopherol (and) Helianthus Annuus (Sunflower) Seed Oil	0.20
MelinOIL™	Isopropyl Palmitate (and) Lecithin (and) Water (and) Acetyl Hexapeptide-1	5.00

SHIMMERING PROTECTIVE SUN OIL 16.125.06 C173

SPF 10

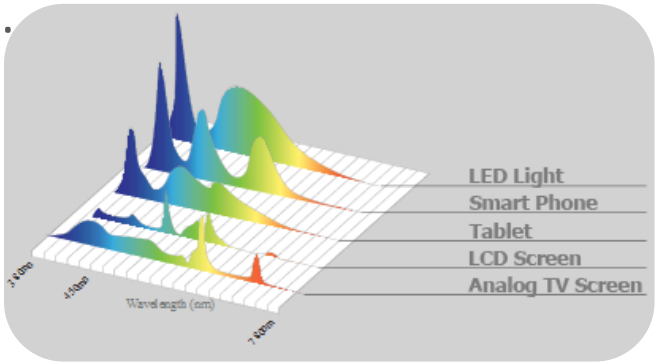
INGREDIENTS	INCI NAMES	%
A Sweet Almond oil	Prunus Amygdalus Dulcis (Sweet Almond) Oil	7.50
SCB Jojoba oil	Simmondsia Chinensis (Jojoba) Seed Oil	15.00
Saboderm TCC	Caprylic/Capric Triglyceride	7.50
Amisol Trio™	Phospholipids (and) Glycine Soja (Soybean) Oil (and) Glycolipids (and) Glycine Soja (Soybean) Sterols	2.00
Dermofeel® TC-7	Triheptanoin	8.90
Schercemol™ CO Ester	Cetyl Ethylhexanoate	34.10
Eusolex™ 9020	Butyl Methoxydibenzoylmethane	3.00
Uvinul® N 539 T	Octocrylene	5.00
Eusolex™ 2292	Ethylhexyl Methoxycinnamate	5.00
Eusolex™ OS	Ethylhexyl Salicylate	5.00
B Solaire 1	Fragrance	0.80
Vitapherole® E1000	Tocopherol (and) Helianthus Annuus (Sunflower) Seed Oil	0.20
MelinOIL™	Isopropyl Palmitate (and) Lecithin (and) Water (and) Acetyl Hexapeptide-1	5.00
SunSHINE® Glitter Golden	Synthetic Fluorphlogopite	1.00

NEW TREND: PROTECTION AGAINST VISIBLE LIGHT & BLUE LIGHT



Scientific knowledge about Visible Light:

- Induces ROS
- Penetrates cells until DNA and induce lesion
- A focus is made on blue light considered as the most harmful (HEV = high energy visible light). As it is particularly emitted by digital devices, skin is highly exposed.

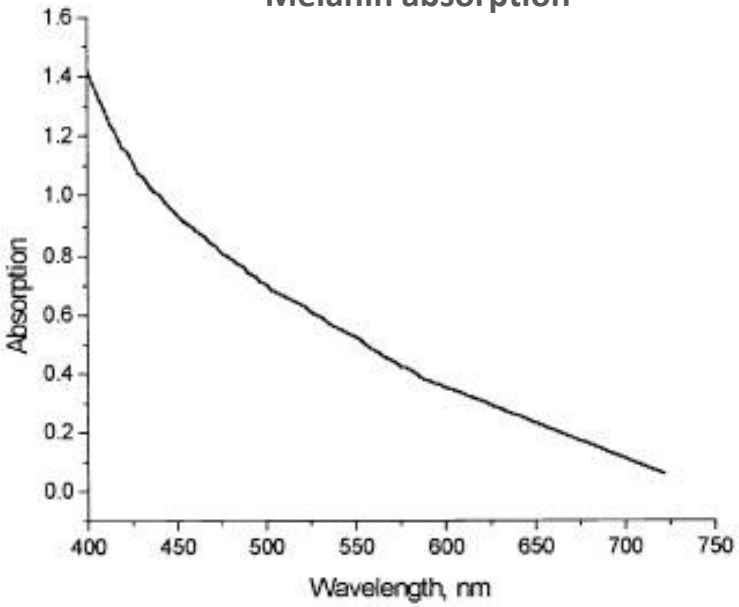


NEW TREND: PROTECTION AGAINST VISIBLE LIGHT & BLUE LIGHT

Melanin is described to:

- Absorb visible light
- Be synthesized under visible light exposure as a natural skin protection

Melanin absorption



By increasing melanin production, MelinOIL™ protects skin from visible light-induced damage

THANK YOU!