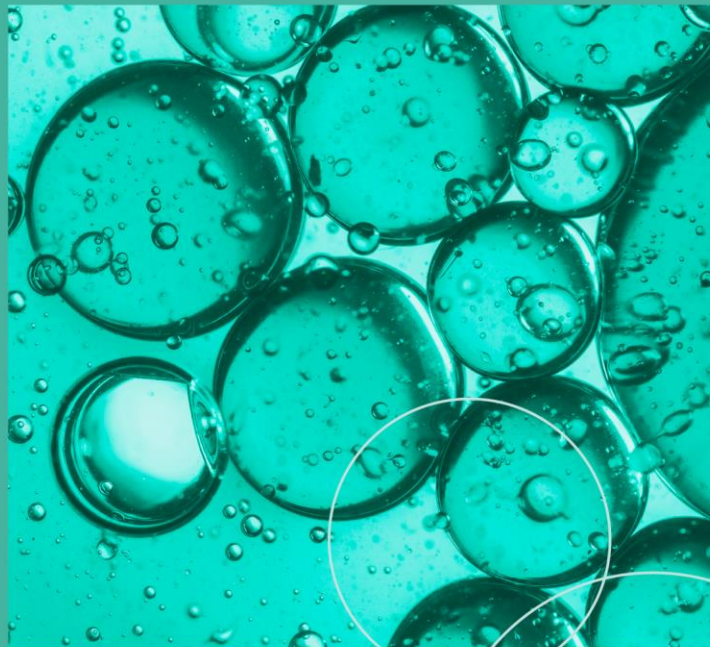


REVITALIN®

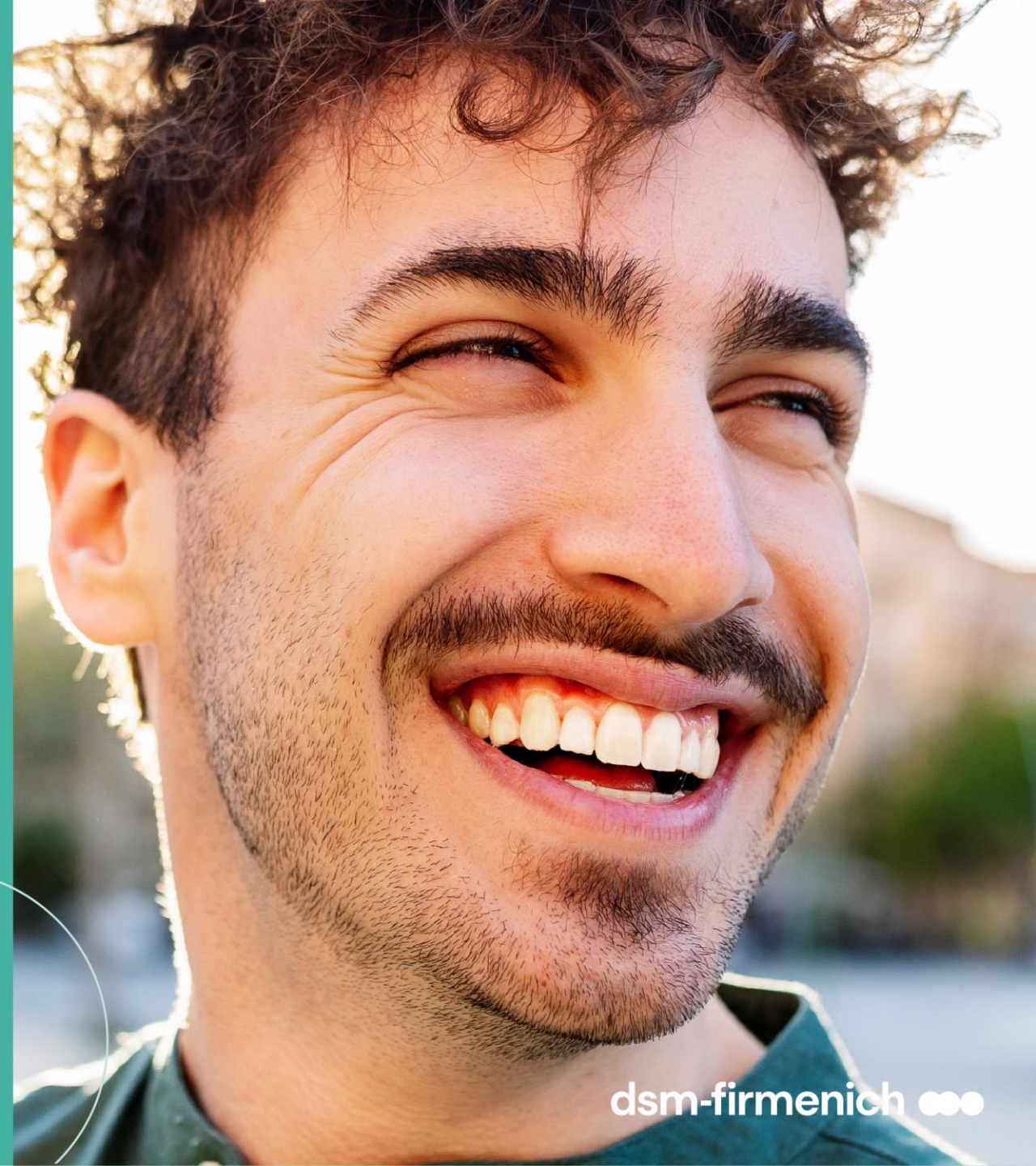
CB

*Vitality booster for
an healthy skin*



April 2025

Biotech | Nature, enhanced by science



dsm-firmenich 

Trend

'Skin Energy & Clean Beauty'

'Skin Energy' is a Big Skin Care Trend.¹

Consumers show an **increasing interest** in naturally functional beauty products to help them **feel energized** and **healthy**.

Clean Beauty

Consumers tend to **avoid controversial ingredients** and showing more interest in '**cleaner**', **energy-boosting products** to adopt healthier and 'cleaner' lifestyles.



'Skin Energy' is crucial for healthy-looking skin

The term 'skin energy' refers to the cellular life force that circulates through the skin.

Skin charged with energy is **radiant and healthy looking**.

Most of a cell's energy is produced by small components inside our cells called **mitochondria (known as the "powerhouses of the cell")**.

The source is **adenosine triphosphate (ATP)** and its presence is an indicator of energy production.

ATP fuels all kind of cellular activities.

But over time, the function of mitochondria slows down depending on a variety of factors such as aging and lifestyle meaning they produce ATP less efficiently.

Skin's energy levels follow a 24-hour rhythm known as the internal clock or circadian rhythm.

- **During daytime hours and particularly with UV stress**, levels of ATP in the cells drop.
- **During nighttime hours** levels of ATP in the cells need to recharge



REVITALIN® CB

ID Card

INCI NAME: Glycoproteins, Glutamic acid, Valine, Threonine, Aqua, 1,2-Hexanediol, Caprylyl Glycol

TECHNOLOGY: Postbiotic mixture of glycoproteins obtained by fermentation of baker’s yeast
Blended with a sophisticated mixture of 3 skin respiration facilitators
98.9% of natural origin (ISO 16128)

TECHNICAL:	Form: Clear yellowish solution Use level: 1–5%	pH of use: 3.0 – 7.5 Preservative: Free	Solubility: Water soluble
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- | | | |
|------------------|--|---|
| BENEFITS: | <ul style="list-style-type: none">• ‘Clean Vitality Booster’ to sustain a healthy-looking skin• Contains a combination of postbiotic glycoproteins and three amino acids• Unlocks the Power of Vital Mitochondria• For controlling circadian rhythm | <ul style="list-style-type: none">• Helps to accelerate skin renewal by up to 4 days**• Maintains sufficient availability of ATP all day long*• Vitality boost for less energetic (tired) skin cells*• Energy kick for stressed skin cells*• Restores mitochondrial vitality after UV stress* |
|------------------|--|---|

REGISTRATION CERTIFICATION					
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With postbiotic, energy-providing glycoproteins

- The postbiotic glycoproteins in REVITALIN® CB are obtained by aerobic fermentation of baker's yeast
- It is made by the extraordinary baker's yeast strain VdH2, known to cause bread to rise and chosen for its ability to provide high cellular energy.
- The resulting biomass undergoes a selective cell autolysis process (breaking down of the membrane of the yeast cells).
- The insoluble fragments are separated and the soluble fraction is purified and concentrated.
- The result is a mixture of **postbiotic, energy-providing glycoproteins**.

Enriched with revitalizing amino acids

REVITALIN® CB is enriched with a sophisticated mixture of 3 amino acids – threonine, valine and glutamic acid – together they support the natural cellular revitalizing capacity.

Threonine

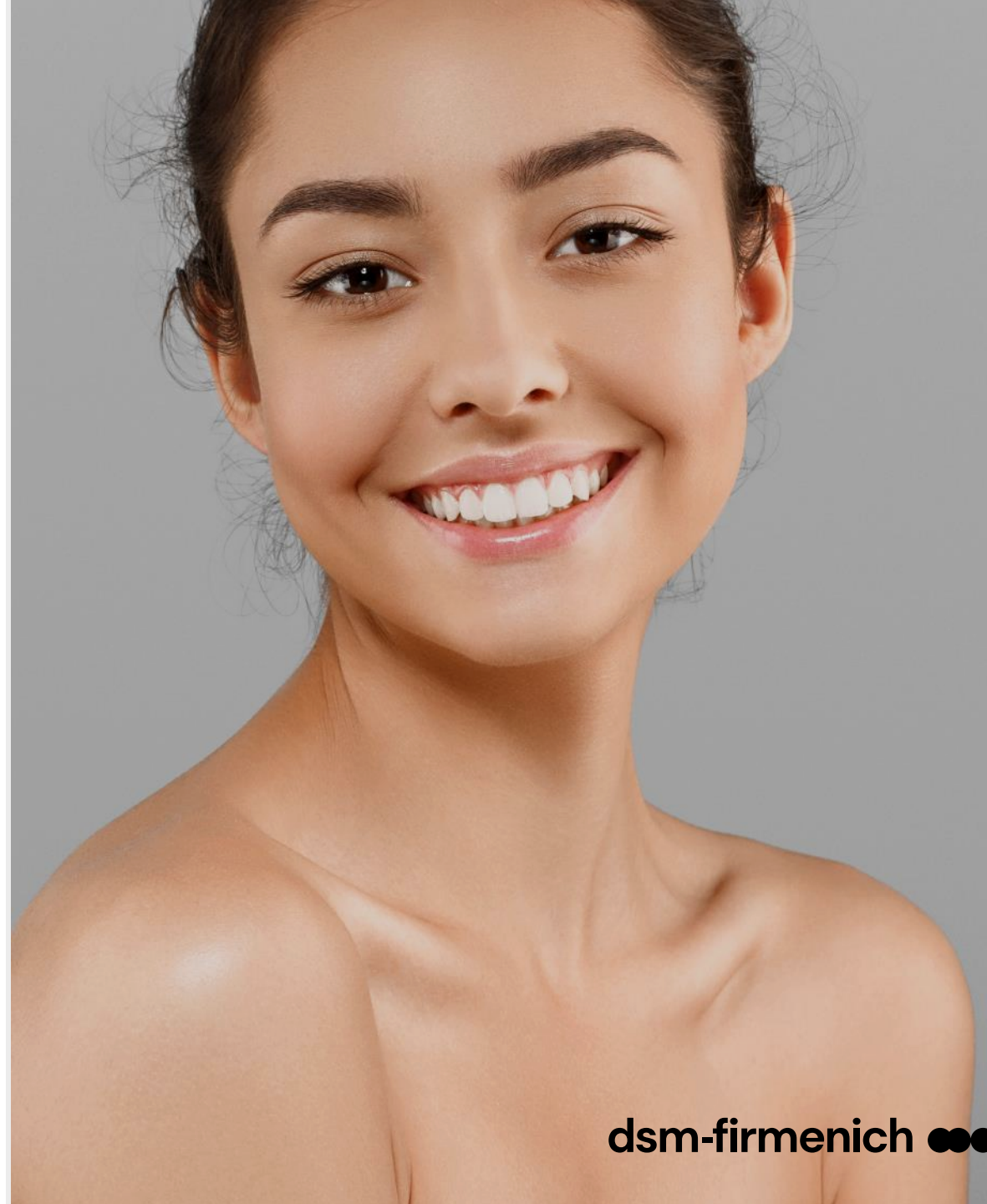
Boosts skin energy factory by enhancing metabolic flux in the mitochondrial matrix

Valine

Serves as an energy fuel to produce more ATP in mitochondria

Glutamic acid

Also supports skin energy production synergistically with Valine and Threonine



Mitochondria: More than just production sites for ATP

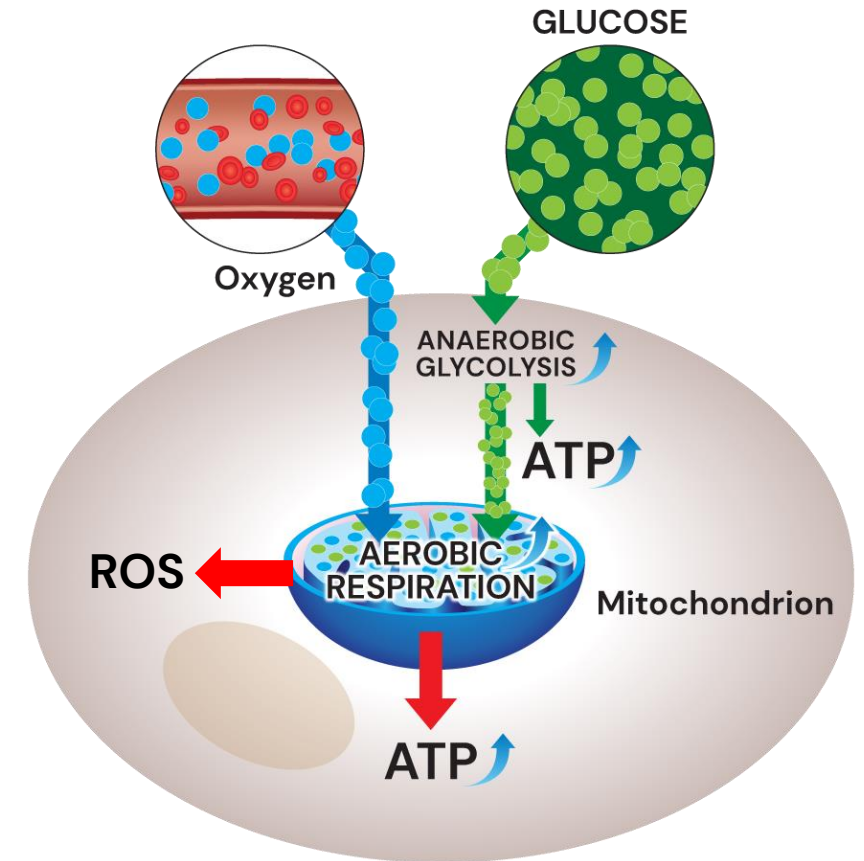
Cell's energy is carried out by the mitochondria and relies on the presence of oxygen and glucose:

- **With oxygen, mitochondria uses aerobic respiration** (breaking down glucose in presence of oxygen) which produce large amounts of ATP.
- **Without oxygen, mitochondria uses anaerobic glycolysis** (metabolic degradation of glucose) to produce ATP in a fast way.

Lack of sufficient oxygen (hypoxia) has negative effects on mitochondria respiration processes and generates ROS stress

- Hypoxia researchers won 2019 Nobel Prize in Medicine
- ROS can damage all molecules in a cell and have long been thought to cause aging.

Aged/damaged mitochondria produces few energy but a lot of reactive oxygen species (ROS)



The aim is to maintain mitochondria vitality but few ROS to keep skin healthiness and glow

Extracellular Flux Analysis Technology

Extracellular Flux Analyzer, produced by Seahorse Bioscience USA, is **the gold standard for measuring cellular bioenergetics** in the pharmaceutical and diagnostic industry



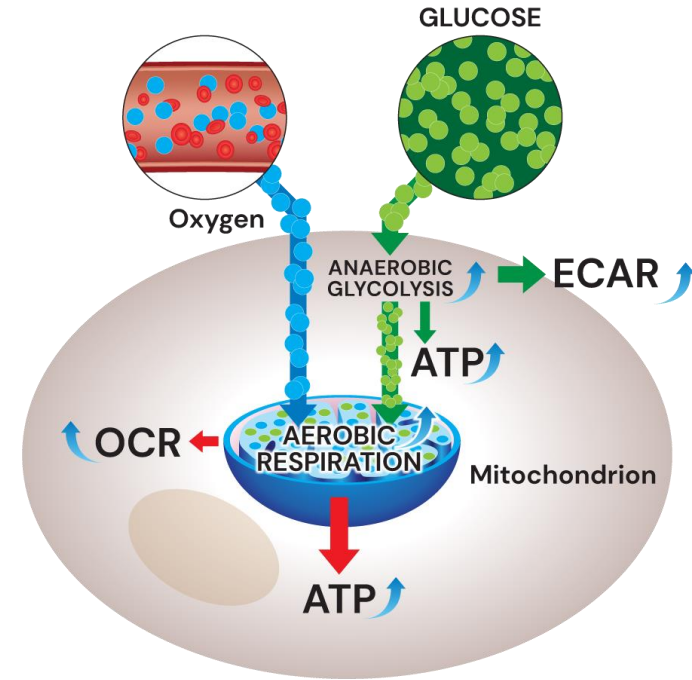
Extracellular flux analysis measures simultaneously the two major energy producing pathways of the cell – **mitochondrial respiration and glycolysis**.

This is done by measuring the rates of **oxygen consumption rate (OCR)** and **extracellular acidification rate (ECAR)** in the media surrounding the cells (extracellular flux).

OCR is predominately the result of mitochondrial respiration – breaking down glucose in presence of oxygen to form ATP

ECAR is an indicator of glycolysis – metabolic degradation of glucose to yield ATP and acid

The **ECAR/OCR ratio** determines the level of energy.



Unlocks the power of 'vital mitochondria

REVITALIN® CB delivers a lot of ATP by boosting the two fundamental mitochondrial pathways*

- 1 Anaerobic glycolysis, measured by ECAR (Extracellular Acidification Rate)³
- 2 Aerobic respiration, measured by OCR (Oxygen Consumption Rate)³
- 3 ATP (Adenosine triphosphate), measured by Mitochondrial Toxglo™ kit⁴

REVITALIN® CB restores mitochondrial vitality after UV stress*

- 4 Stimulates mitochondria-related genes linked to cell energy, regeneration and detoxification*

REVITALIN® CB sustains a healthy- looking skin**

- 5 Helps to accelerate cell renewal activity by up to 4 days**.

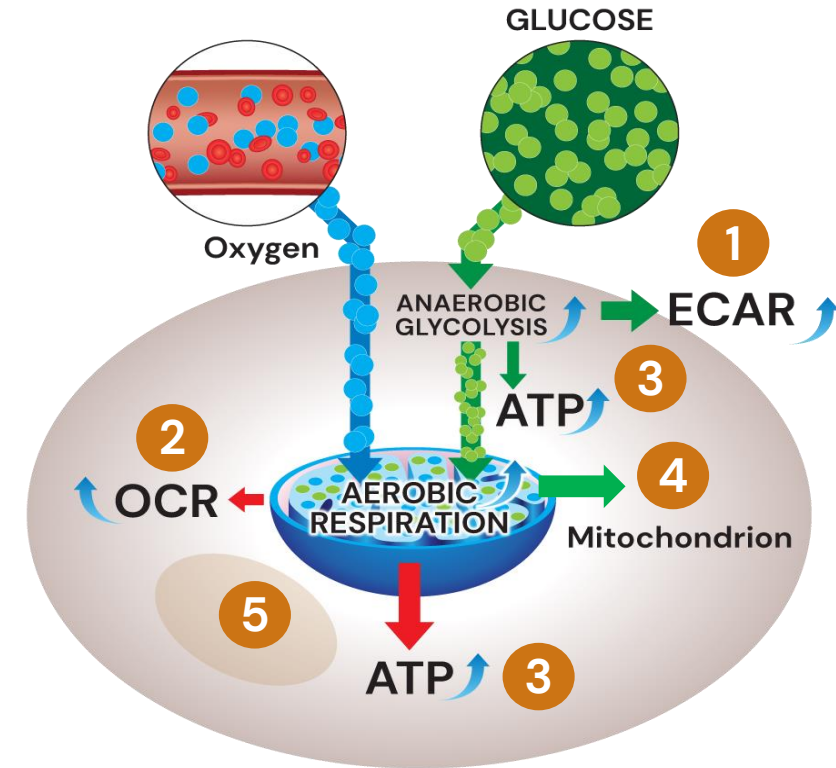
* In vitro ** In vivo

1 R. Schütz et al. / Journal of Photochemistry & Photobiology, B: Biology 159 (2016) 142–148

2 R. Schütz et al. / Monitoring the energy status of primary human keratinocytes and the effect of REVITALIN® CB on cellular homeostasis, IFSCC 2014

3 Extracellular Flux Analyzer, produced by Seahorse Bioscience USA

4 Mitochondrial Toxglo™ kit, produced by Promega USA



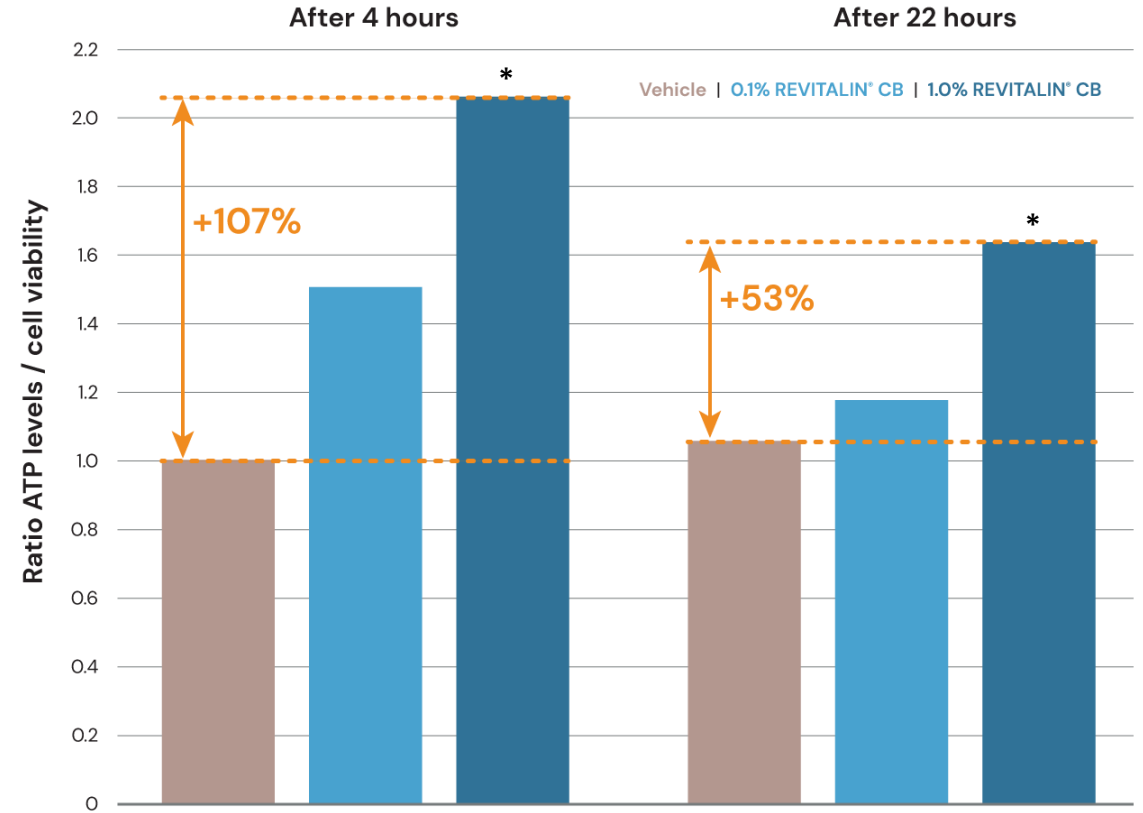
Maintains sufficient availability of ATP supply all day long

Effect of REVITALIN® CB on cellular viability and ATP in human primary keratinocytes

Cellular viability and Cellular ATP levels were measured by Mitochondrial ToxGlo™ Assay.

REVITALIN® CB (0.1% and 1.0%) shows pronounced, dose-dependent, significant effect on ATP levels in human primary keratinocytes (HPEK).

Enhanced ATP levels by up to 110% after 4 hours and by up to 53% after 22 hours*



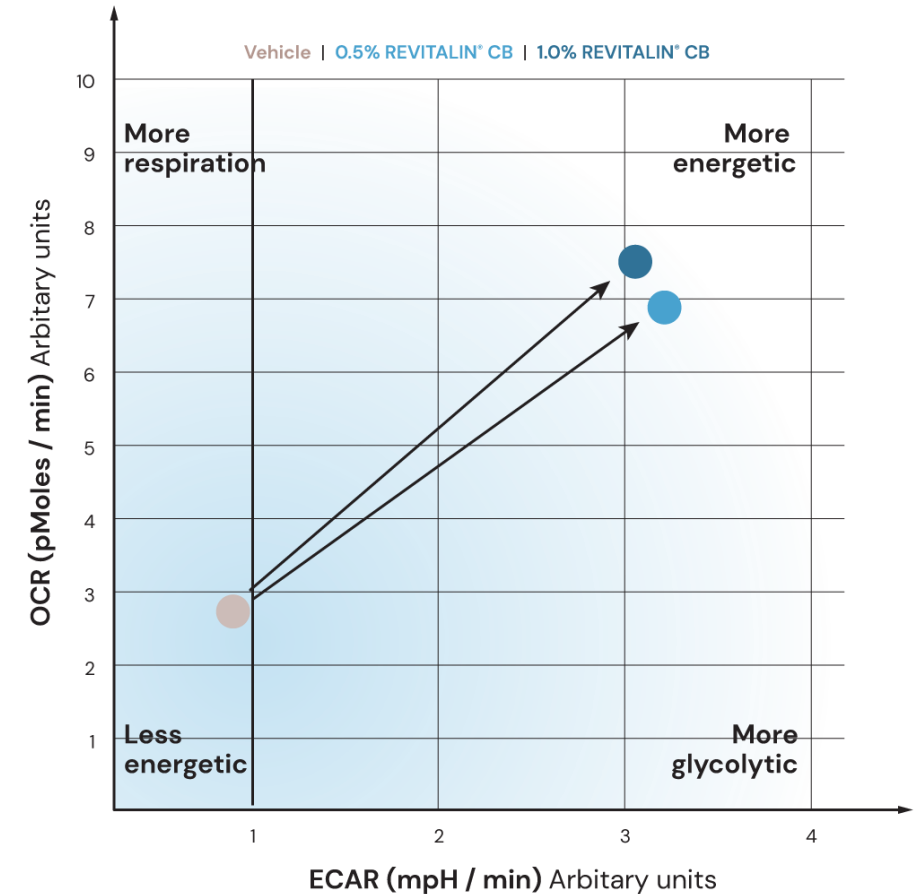
ATP levels vs cell viability in keratinocytes after 4 and 22 hours of REVITALIN® CB treatment, respectively. The data are expressed as ratio of ATP production versus cell membrane integrity by caspase activity. *p < 0.01 (n = 3).

Vitality boost for less energetic (tired) skin cells

Effect of REVITALIN® CB on respiration and glycolysis in less energetic human primary keratinocytes

Real-time measurements of the OCR and ECAR were performed with Seahorse Bioscience XFe96 Extracellular Flux Analyzer. Less energetic human primary keratinocytes were pre-treated for 4 hours with REVITALIN® CB (0.5%; 1%).

Vitality boost for less energetic (tired) skin cells, as reflected in the ECAR/OCR matrix*



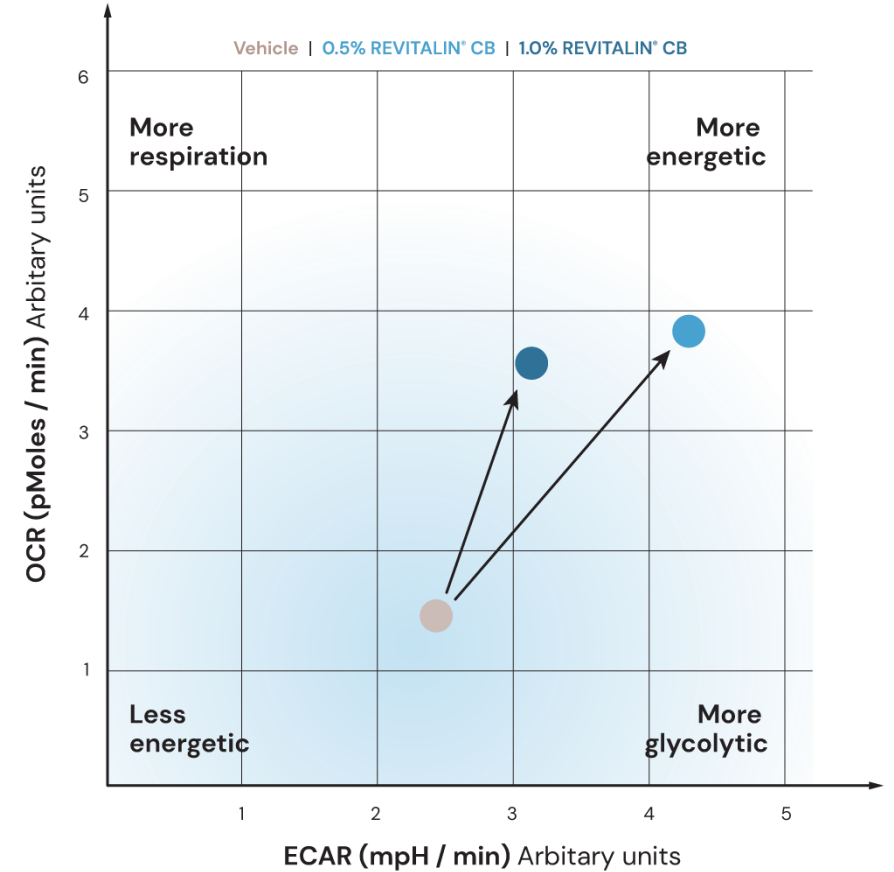
Effect of REVITALIN® CB (0.5% and 1.0%) on respiration and glycolysis referring to less energetic keratinocytes compared to vehicle-treated cells after 4 hours treatment

Energy kick for stressed skin cells

Effect of REVITALIN® CB on respiration and glycolysis in *stressed* human primary keratinocytes

Real-time measurements of the OCR and ECAR were performed with Seahorse Bioscience XFe96 Extracellular Flux Analyzer. Chemically stressed human primary keratinocytes, which simulated mitochondrial dysfunction were pre-treated for 4 hours with REVITALIN® CB (0.5% and 1.0%).

Energy kick for stressed skin cells, as reflected in the ECAR/OCR matrix*



Effect of REVITALIN® CB (0.5 and 1.0%) on respiration and glycolysis referring to chemically induced, stressed keratinocytes compared to vehicle-treated cells after 4 hours treatment.

Restores mitochondrial vitality after UV stress*

Effect of 0.5% REVITALIN® CB on expression of mitochondria-related genes in human keratinocytes 4 hours after UVB-irradiation (60 mJ/cm²)*

Significant effects are observed on key genes linked to:

Energy production

+75% ATP5A1 (ATP synthesis)

+138% UCP2 (Mitochondrial proton flux)

Cell regeneration

+89% AIP

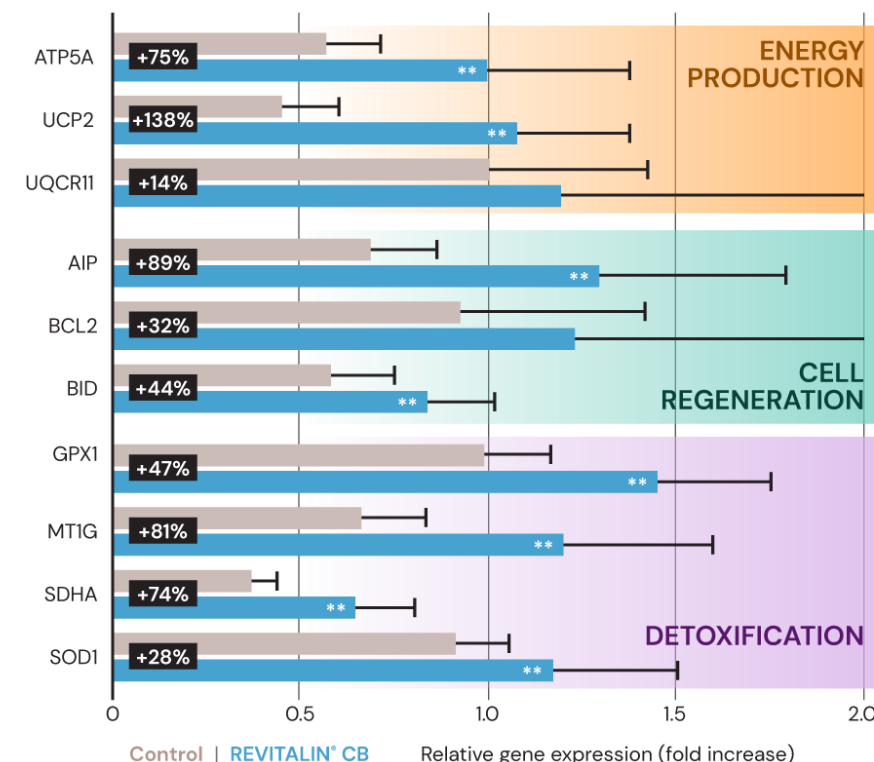
+44% BID

Activation of Detoxification helps to reduce hypoxic conditions

+47% GPX1 (Detoxification of hydrogen peroxide)

+81% MT1G (Detoxification of heavy metals)

+28% SOD1 (Detoxification of superoxide radicals)



Effect of 0.5% REVITALIN® CB (blue bars) on expression of mitochondria-related genes in human keratinocytes 4 h after UVB-irradiation (60 mJ/cm²) relative to the vehicle treated, UV-irradiated control (gray bars). Data are represented as fold change ± SEM from three observations (**significance level $p < 0.01$ vs. UV-irradiated vehicle control).

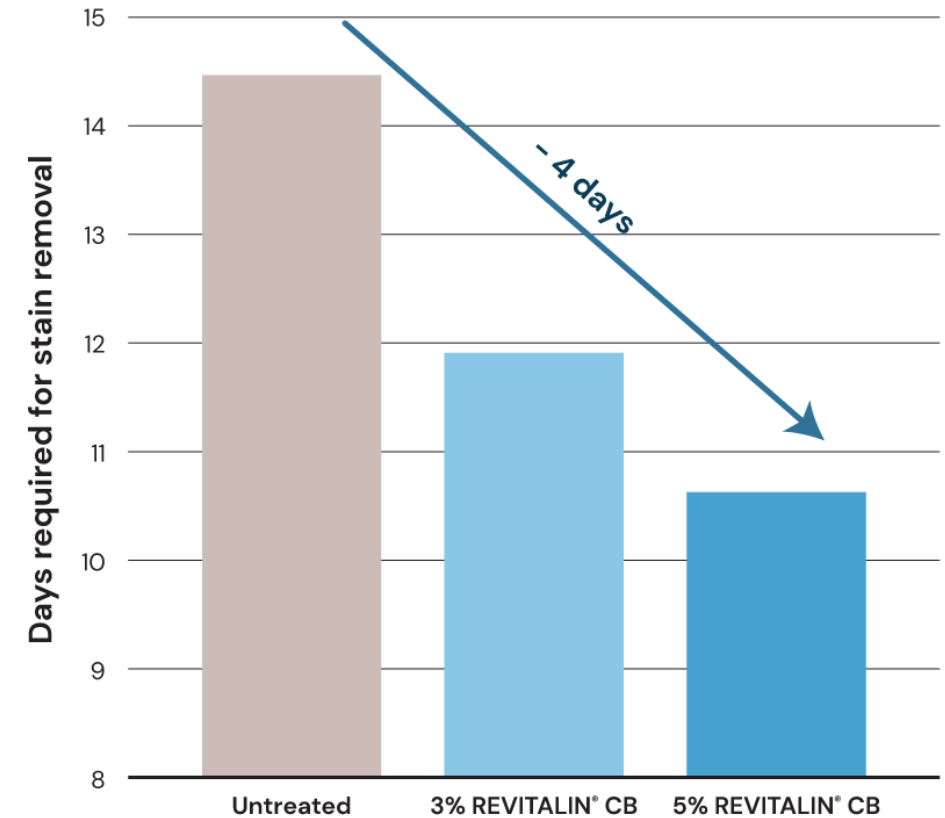
Helps to accelerate in vivo skin renewal by up to 4 days

Standard dansyl-chloride method:

A glowing complexion and fresh-looking skin is assessed by measuring skin renewal using the dansyl-chloride staining method.

The ability of REVITALIN® CB to stimulate skin cell turnover was tested when twelve volunteers (aged 30–55 years) applied 3% and 5% REVITALIN® CB on their forearms twice a day for a period of 20 days. The time for removal of all dansyl chloride staining was determined.

REVITALIN® CB helps to accelerate skin renewal by up to 4 days to sustain a healthy-looking skin**

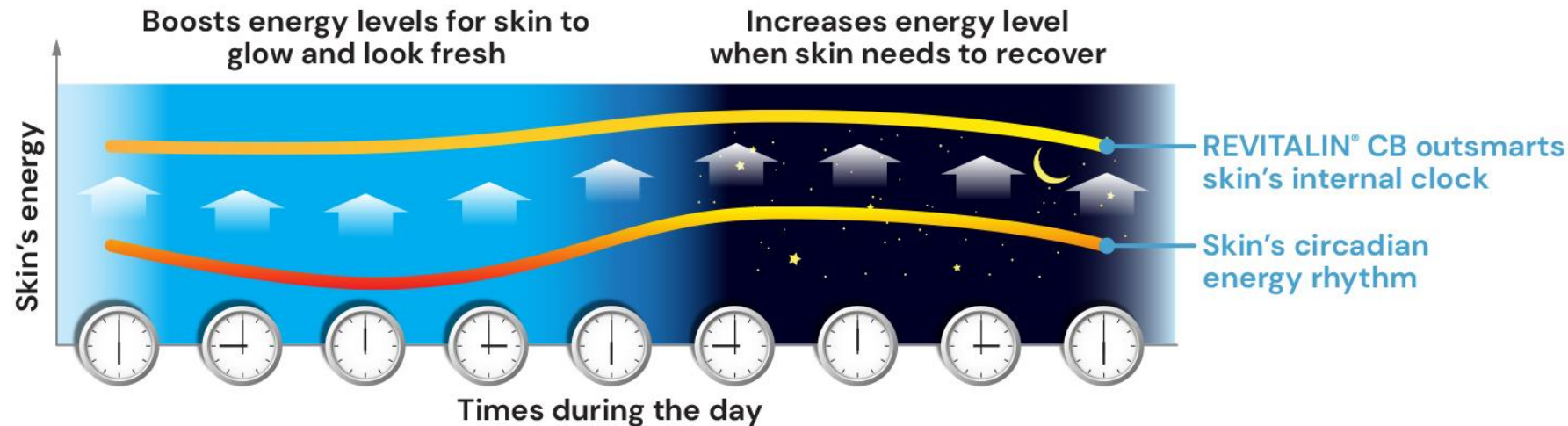


Outsmarts skin's internal clock

For controlling circadian rhythms

Skin that is optimally energized throughout the cell's circadian rhythm has a consistent glow and generally fresh complexion.

REVITALIN® CB recharges skin cells with energy during the skin's nighttime and boosts daily energy levels when skin needs it most.

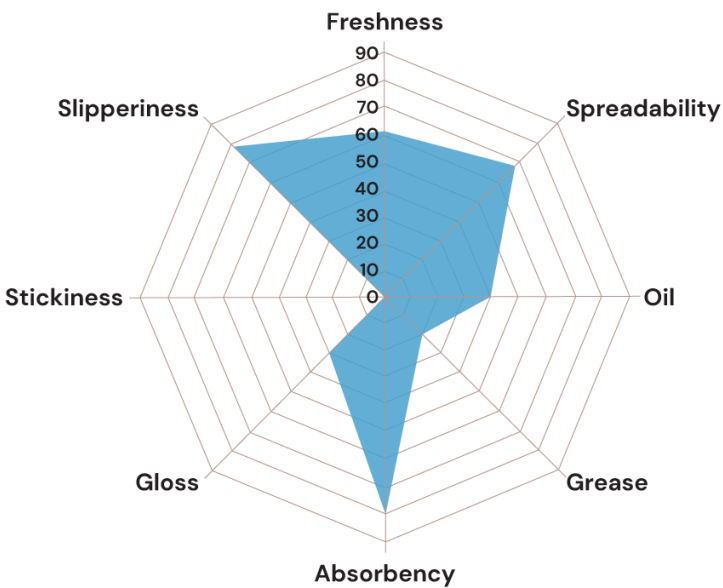


REVITALIN® CB

Energy-boosting Cream-gel

The Energy-boosting cream Gel is designed to intensely and durably refresh the whole face. It's perfect to use every morning and leaves tired and dull skin looking fresh, glowing and naturally beautiful all day long.

Tested by our sensory panel:
light (low grease, low oil), fresh, easy to spread, reasonable playtime and unchanged slip of the skin.



Energy-boosting Cream Gel

92.85% natural origin content*

	Ingredients	% w/w	Function
A	C12-15 ALKYL BENZOATE	4,50	Emollient
	OCTYLDODECANOL	4,00	Emollient
	CETEARYL ALCOHOL	2,00	Thickening agent, Emulsion stabilizer
	ACRYLATES/C10-30 ALKYL ACRYLATE CROSSPOLYMER	0,20	Emulsifier, Thickening agent
	NEOPENTYL GLYCOL DIHEPTANOATE	3,00	Emollient
	CAPRYLIC/CAPRIC TRIGLYCERIDE	6,00	Emollient
	HYDROGENATED COCO-GLYCERIDES	1,00	Emollient
B	PHENOXYETHANOL, ETHYLHEXYLGLYCERIN	0,90	Preservative
	GLYCERIN	2,00	Humectant
	XANTHAN GUM	0,20	Rheology modifier
	AQUA	73,45	Solvent
C	AQUA, SODIUM HYDROXIDE	0,70	pH adjuster
D	REVITALIN® CB (GLYCOPROTEINS, GLUTAMIC ACID, VALINE, THREONINE, AQUA, 1,2-HEXANEDIOL, CAPRYLYL GLYCOL)	2,00	Active
E	PARFUM	0,05	Provides olfactive identity

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Procedure

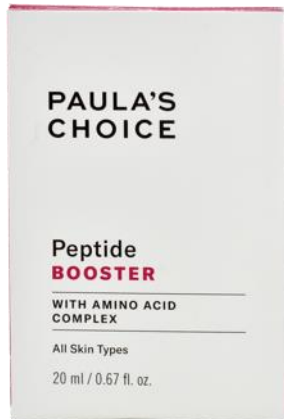
1. Prepare Phase A and heat up to 75 °C under stirring.
2. Prepare Phase B and heat up to 75 °C.
3. Add Phase B into Phase A under stirring and homogenize.
4. Add Phase C under stirring.
5. Cool down to 35 °C under stirring.
6. Prepare Phase D and add it into the emulsion under stirring, then homogenize for 1 min.
7. Adjust pH to 5.0 – 6.0 if necessary.

Technical data

pH: 5,4

Viscosity: 11140 mPa.s
(spindle 5 / 10 rpm)

Market products with Glycoproteins, Valine, Threonine, Glutamic acid...



**Peptide Booster
With Amino Acid Complex**
USA



**Vital Hydra
Sleeping Mask**
South Korea



**Time
Revolution Vitality**
South Korea



**Functional
Repairing Cream**
Switzerland



**Stress Repair
Concentrate+**
USA



**Perfect One
Night Cream**
Japan



**Vitality
Sleeping Mask**
France

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