



PIONEER
IN STEM CELL
ACTIVES

PhytoCellTec™ Solar Vitis
Protects epidermal stem cells
against UV damage



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A Revolutionary Technology to Protect Skin Stem Cells against UV-induced Aging

PhytoCellTec™ Solar Vitis is a powder based on the stem cells of a rare red-flesh grape tolerant to strong UV radiation.

UV radiation is responsible for 80 % of face aging. Despite the use of sun filters, toxins and oxidants are generated by UV in the skin. This affects the most sensitive cells such as the epidermal stem cells which are rare and essential. Thus, their protection against UV stress is of great importance.

A rare grape cultivar of Gamay was selected. Stem cells from this cultivar were obtained using our PhytoCellTec™ technology and were then incorporated in a water-soluble powder.

These grape stem cells contain special epigenetic factors and metabolites which are able to protect human skin stem cells against UV radiation.

Using a novel Progenitor Cell Targeting technology, PhytoCellTec™ Solar Vitis was shown to:

- help the skin stem cells to maintain their stem cell characteristics
- protect these precious cells against the stresses induced by UV, the main aging factor.

Claim Ideas for PhytoCellTec™ Solar Vitis

- Protects skin stem cells against UV stress
- Delays senescence of essential cells
- Fights photo-aging
- For a vital and healthy-looking skin

Applications

- Advanced "stem cell cosmetic" formulas
- Face and body care to protect the most valuable skin cells, the stem cells
- Daily skin care to prevent photo-aging

Formulating with PhytoCellTec™ Solar Vitis

- Recommended concentration: 0.4 – 1 %
- Incorporation: Dissolve PhytoCellTec™ Solar Vitis into the aqueous phase or add pre-solved (20 % in water) PhytoCellTec™ Solar Vitis during the cooling phase (< 60°C).
- Thermostability: Temperatures of up to 60°C for a short time do not affect the stability of PhytoCellTec™ Solar Vitis.

INCI / CTFA-Declaration

Vitis Vinifera (Grape) Fruit Cell Extract (and) Isomalt (and) Lecithin (and) Sodium Benzoate (and) Aqua / Water

Additional Information

- PhytoCellTec™ Solar Vitis contains 50 % of Solar Vitis stem cell extract
- Phenoxyethanol-free

PhytoCellTec™ Solar Vitis

A grape cultivar with a high self-protecting power

High Anthocyanin Content in a Rare Grape

PhytoCellTec™ Solar Vitis is based on the stem cells of the Gamay Teinturier Fréaux grape. This cultivar, originating from the Burgundy region in France, is characterized by its red flesh and juice due to the extremely high anthocyanin content.

Most red grape varieties have white flesh under their skin but in the case of the Gamay Teinturier Fréaux, anthocyanin pigments are also present in the pulp. Anthocyanins are powerful antioxidants and free radical scavengers. They act as a "sunscreen" by absorbing UV radiation. Their effectiveness is further enhanced by interaction with other metabolites substances present in the grape.

The high level of tannins in this grape gives an undesirable taste to wines. This variety has therefore, almost completely disappeared.

Protection of Stem Cells is Essential

Our skin contains stem cells which are located in the basal layer of the epidermis.

Their main functions are to replenish and maintain the balance of cells within the skin as well as to regenerate damaged tissues.

Epidermal stem cells are thus:

- essential for the renewal and repair of the skin
- the unique source of keratinocytes.

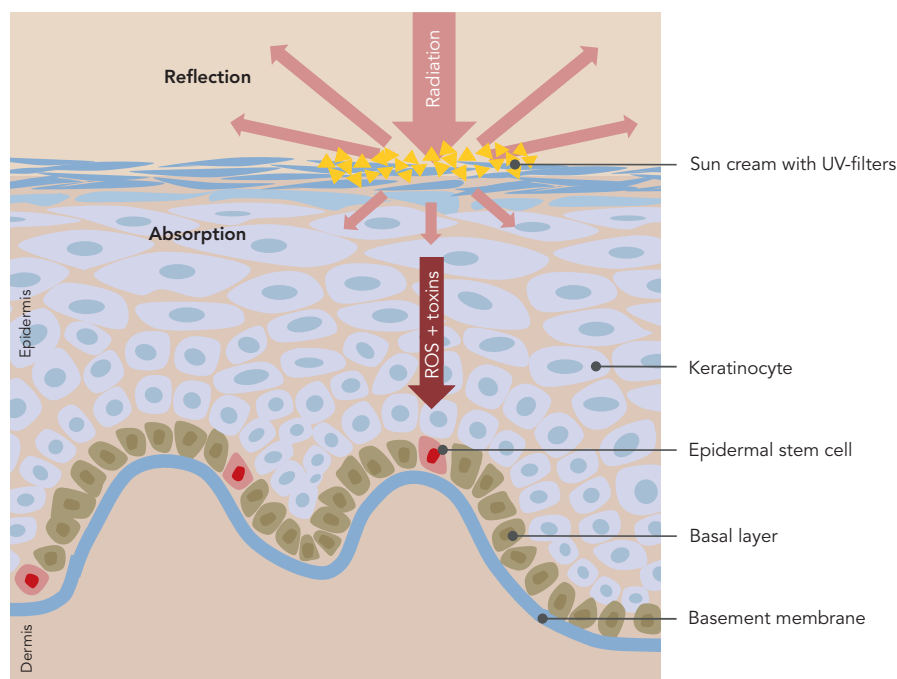
Therefore, their protection is of great importance.

Skin Stem Cells and UV Radiation

UV radiation which generates toxins and reactive oxygen species (ROS) in the skin, is responsible for 80 % of face aging.

Despite the use of sun filters, toxins and ROS are still generated by UV in the skin. These affect the most sensitive cells such as the epidermal stem cells. That is why the protection of skin with sun filters is insufficient.

Skin Stem Cells and UV Stress



PhytoCellTec™ Solar Vitis

Grape stem cells to protect skin stem cells

Plant Stem Cells for Skin Stem Cells

In contrast to human cells, those from plants are totipotent, meaning that every cell is able to regenerate new organs or even the whole plant. Also, all plant cells can dedifferentiate and become stem cells.

All stem cells, independent of their origin (plant, animal or human) contain specific epigenetic factors whose function is to maintain the self-renewal capacity of stem cells.

Biotechnology to Cultivate Plant Stem Cells

Mibelle Biochemistry has developed a novel technology (PhytoCellTec™) based on the wound-healing mechanism of plants.

Part of a plant is wounded to induce the formation of callus cells. This wound-healing tissue consists of dedifferentiated cells which are stem cells. Callus cells are harvested and cultivated in suspension and a novel bio-reactor system enables large scale production.

To obtain the PhytoCellTec™ Solar Vitis cosmetic ingredient, these stem cells are harvested and homogenized at 1200 bar together with phospholipids to encapsulate and stabilize oil- and water-soluble components into liposomes. The resulting extract is carefully sprayed on to a powder based on isomalt.

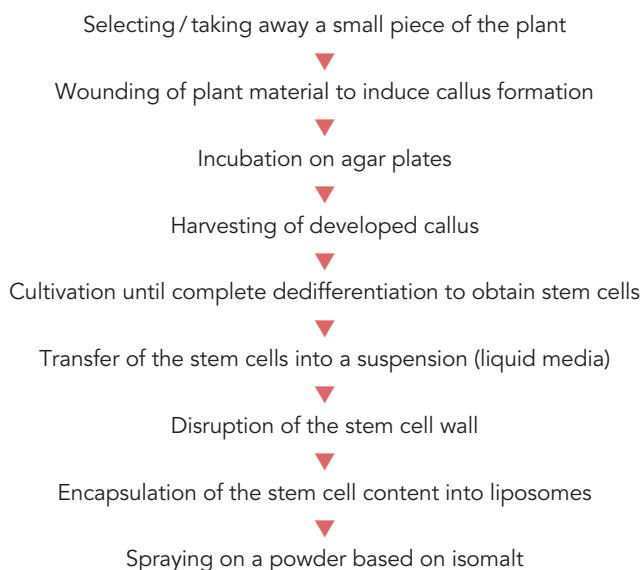
PhytoCellTec™ Solar Vitis is thus rich in epigenetic factors and metabolites which are able to protect stem cells against UV radiation.

Advantages of PhytoCellTec™ Technology

This innovative technology developed by Mibelle Biochemistry offers the following advantages:

- Possibility to cultivate cells of rare and endangered plants while respecting the environment
- Availability of plant material independent of the season and market' demand
- Plant material completely free of environmental pollutants and pesticides
- Constant concentrations of metabolites in the stem cells

PhytoCellTec™ Solar Vitis Process



PhytoCellTec™ Solar Vitis

Study results



Preparation of Epidermal Stem Cells

A novel Progenitor Cell Targeting technology was used to prepare human epidermal stem cells.

This technology consists of culturing a skin sample in a medium specifically designed to mimic the micro-environment of the stem cell in the epidermis.

This special, fully defined cell culture medium leads to an enrichment of so called keratinocyte progenitor cells that can be considered as stem cells. This enrichment was controlled by quantifying the cells through FACS (Fluorescence-Activated Cell Sorting) which were labelled with CD34 and $\alpha 6$ integrin, two known markers of epidermal stem cells. Compared to freshly isolated cells, the cell population of passage 3 was characterized by a 10-fold increase of CD34/ $\alpha 6$ integrin double labelled cells.

The Progenitor Cell Targeting technology provides a cell culture model to study the effects of compounds on epidermal stem cells.



The Capacity to Form a Colony is a Characteristic of Stem Cells

Stem cells can make identical copies of themselves as well as generate specialized cells.

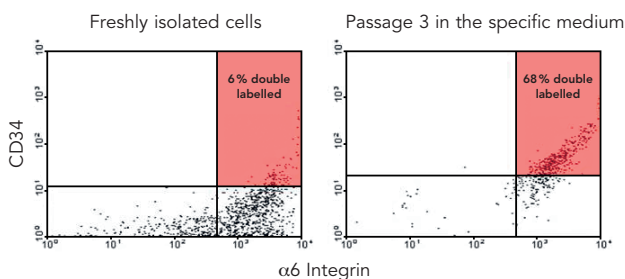
They have the capacity to form a colony consisting of:

- themselves
- transient amplifying cells (cells in an intermediate state)
- differentiated cells.

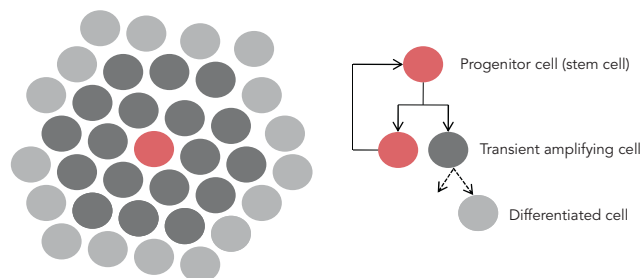
This capacity to form a colony, called CFE (colony-forming efficiency), is a characteristic of stem cells.

To measure CFE, cells are seeded at a low density. The number of colonies formed is a value of the concentration of vital progenitor/stem cells.

Enrichment of Keratinocyte Progenitor Cells



Capacity to Form a Colony (CFE)





Maintenance of the Characteristics of Epidermal Stem Cells

The epidermal stem cells obtained using the method described previously, were treated with different concentrations of the Solar Vitis stem cell extract. Then, the effect of the Solar Vitis stem cell extract on the CFE was analysed.

Results showed the capacity of the Solar Vitis stem cell extract to strongly increase the CFE: the CFE was stimulated by almost 50 % in the presence of 0.04 % Solar Vitis stem cell extract and by almost 80 % in the presence of 1.25 % Solar Vitis stem cell extract.

This clearly shows that Solar Vitis stem cell extract helps the epidermal stem cells to maintain their stem cell characteristics ("stemness").



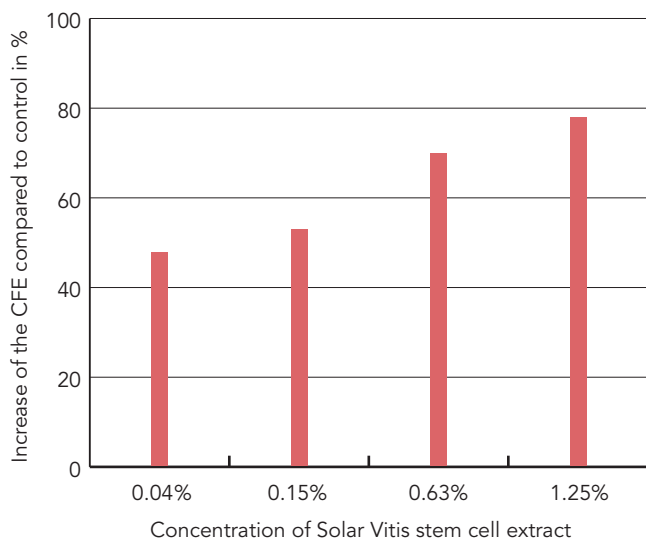
Protection of Epidermal Stem Cells against UV Stress

The epidermal stem cells obtained using the method described previously, were treated with and without the Solar Vitis stem cell extract. Some were then exposed to UVA+UVB-light at 450 kJ/m² whilst others were left unexposed. Afterwards, the CFE was determined.

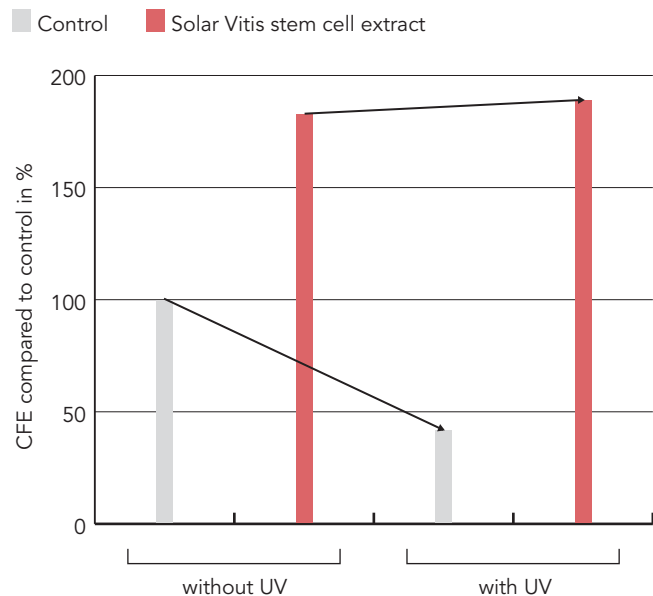
- Results confirmed that the Solar Vitis stem cell extract increased the CFE of epidermal stem cells.
- Results also showed a 58 % decrease of the CFE when epidermal stem cells were exposed to UV radiation (control). But, the presence of the Solar Vitis stem cell extract could completely counteract the negative effect of UV on these cells: the CFE remained at the same level.

This clearly shows that Solar Vitis stem cell extract protects epidermal stem cells against UV-induced stress.

Increase of the Colony-Forming Efficiency (CFE)



Protection of Stem Cells against UV Stress



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Marketing Benefits

- Plant stem cells to protect skin stem cells
- Proven efficacy on skin stem cells

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