

PhytoCellTec™ Symphytum - Stem Cell Activation for Smoother and More Even Skin

Comfrey cells enhance proliferation of epidermal stem cells for an increased epidermal turnover rate

The skin forms a barrier that protects us against dehydration and external threats. This barrier function is provided mainly by the outer skin layer, called the epidermis. This layer is constantly renewed; cells that are shed from the outer layer, the stratum corneum, are replaced by newly formed cells from the inner layer of the epidermis. This constant renewal is important for the quality of the barrier and keeps the skin smooth and even. The epidermal turnover time is about 1 month. But between our thirties and eighties the turnover rate reduces by 30 to 50%, leading to a much longer turnover time. The consequence of the slowdown of the renewal in elderly people is a dry, rough, uneven and dull skin.

Responsible for the constant renewal are epidermal stem cells that are dispersed in the inner layer of the epidermis. Only these cells have the potential to generate new cells for tissue renewal. But the rate of propagation of these cells is known to be reduced in elderly people. This is the principal reason for the reduced turnover rate and thus for the slowdown of the epidermis renewal with advancing age.

PhytoCellTec™ Symphytum activates the propagation rate of our epidermal stem cells. It thus restores the renewal potential of aged skin. PhytoCellTec™ Symphytum is an extract of comfrey stem cells. The plant cell culture technique was used to produce the plant raw material in an ecological and sustainable way. The technique is based on the cultivation of dedifferentiated

plant cells. Comfrey root was used to start the culture. Sterilised plant material was cut and newly, completely dedifferentiated cells were formed as part of the wound healing reaction. These newly formed cells were then propagated in liquid media and cultured in big fermenters under standardised conditions to produce large amounts of plant stem cells. Extracts of plant stem cells from several species were shown to exert positive effects on the stem cells of the epidermis and of the dermis. The ingredients were found to promote and protect the characteristics of human skin stem cells and thus to prevent premature differentiation.

Comfrey is a perennial shrub with purple or pink flowers, native to Europe, growing in damp, grassy places. Comfrey is used as herbal medicine, mainly for skin treatments. Comfrey ointments are applied for wound-healing and the treatment of bone fractures.

The positive effect of the comfrey cell extract on the propagation rate of epidermal stem cells was discovered in a novel cell culture assay. An ageing medium was developed that mimics the tissue environment of elderly people. Normal culture media are rich in protecting compounds and in order to analyse anti-ageing effects, cells have to be stressed with unnatural high doses of H₂O₂ or ultraviolet. To mimic the tissue environment of elderly people, a cell culture medium was developed that

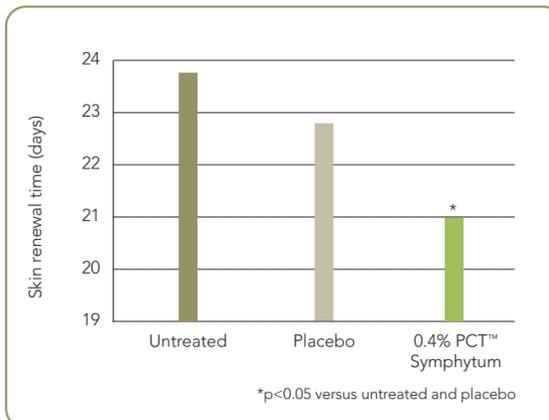
contained the essential elements but was devoid of protecting and stimulating compounds. The proliferation of isolated epidermal stem cells cultured in this ageing medium was clearly reduced compared to a normal medium. But epidermal stem cells cultured in the ageing medium supplemented with low amounts of the comfrey cell extract, proliferated much more than in the control culture without comfrey cell extract. The same ageing medium was also used to culture three dimensional models of the epidermis. Like in real skin, isolated epidermal stem cells proliferate and differentiate forming vertically all the different epidermal cell layers including a stratum corneum. Compared to a normal medium, the epidermis formed in the ageing medium was much thinner and contained less hyaluronic acid. Both aspects, morphology (thickness) and hyaluronic acid content, were clearly improved when the epidermis was formed in the ageing medium supplemented with the comfrey cell extract.

Next, the comfrey cell extract was formulated into a vehicle cream and was tested in a clinical trial with 20 women, aged between 40 and 60. After 4 weeks application, a significant increase in the skin renewal rate was found. Concomitant, skin smoothness analysis by PRIMOS showed a 12% improvement.

As we get older, the skin renewal slows down leading to an uneven surface and the formation of scales. This has a negative

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influence on skin complexion and makes the skin look dull and grey. Instead of using irritating peeling procedures, Mibelle Biochemistry Group proposes PhytoCellTec™ Symphytum to get down to the root of the trouble. Epidermal renewal starts at stem cells dispersed in the inner layer. The proliferation capacity of these cells and of their next progeny defines the epidermal turnover rate. It is known that their proliferation is reduced in elderly skin. PhytoCellTec™ Symphytum stimulates the proliferation of these cells compensating for the usual deterioration during aging. It leads to an improved epidermal turnover rate and finally to a smoother skin and to a much better skin complexion.



3D Epidermis

