

## Revolutionary concept of UV-protection prevents effectively from liver spots, skin aging and mutation of mitochondrial DNA.

- Scientific study provides evidence of high efficiency -

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Sunlight has various bio-positive benefits. It initiates the high effective health beneficial natural Vitamin-D<sub>3</sub> production in the skin of people of all ages and skin types. Sunlight vitalizes mind, body and spirit and gives a healthy sun tan. But until recently, exposure to dangerous and damaging invisible UVA-rays from sunlight harmed skin, hair and eyes at the same time. UVA-radiation supports production of reactive oxygen species, playing a major role in generation of premature skin aging and persistent mitochondrial DNA (mtDNA) damage. Recent evidence has linked mtDNA damage to several disease processes. According to latest studies, a revolutionary German UV-protection system effectively prevents skin from dangerous sun-rays before they harm.

### Objective of study

Exposure to UV-radiation leads to an increased production of highly reactive oxygen radicals (ROS, free radicals) in the mitochondria, „the power plants of the cells“ and thus to a damage of the mitochondrial DNA (DNA = *Desoxyribonukleinacid* = master plan and genetic matrix of humans). The most frequent and best characterized mutation of mtDNA is a 4977 bp deletion, designated as common deletion. Mutations of mtDNA are biomarker of sun exposure and play a crucial role in aging, carcinogenesis and in pathogenesis of several diseases.

The objective of a study conducted at the Department of Dermatology at the Eberhard Karls University of Tuebingen, Germany, supported by the federal state of Baden-Wuerttemberg, was to proof evidence of protection effect of HelioVital UV filter films qualitatively and quantitatively (as detailed described Heliotherapies in Medical Journal of Complementary and Integrative Medicine KiM (10/2008) [2]) against mutation of mtDNA caused by UV-radiation [1]).

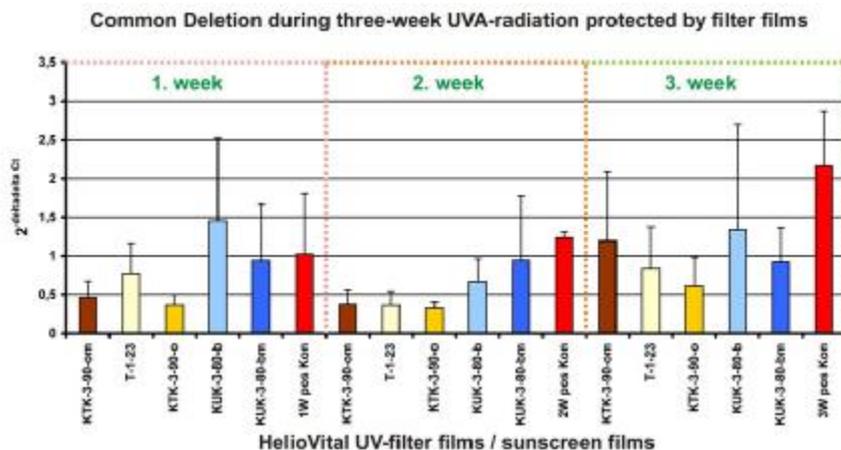
### Experimental procedures

- In order to generate common deletion, normal human skin fibroblasts were irradiated three times daily with 8 J/cm<sup>2</sup> UVA over a period of 1, 2 and 3 weeks. A specific filter film was fixed between irradiation device and fibroblast. Control fibroblast remained unprotected as a reference.
- Total cellular DNA was extracted from respective cells.
- Verification of mtDNA content was carried out with PCR (Polymerase Chain Reaction). The used and tested filter films (sunscreen films) were five different HelioVital filter films which were all different in their specific steady transmittance spectrum and one was a „pure“ film with selective UV-filtration (T-1-23) without additional functionalization (like coloring and metallization).

### Results

During the three-week irradiation by direct UVA-radiation, an increase of common deletion was detected in the control fibroblasts, which were not protected by any filter films. However, all the fibroblasts which

were protected by different filter films showed a substantially lower change of the content of common deletions during the three-week irradiation.



#### Caption:

DeltaDelta-CT ≤ 1 indicates protection from common deletion. DeltaDelta-CT > 1 is a sign of increase of common deletion. Effective protection of a filter system exists, if the DeltaDelta-CT of a protected fibroblast is lower than the DeltaDelta-CT of the unprotected control fibroblast (in the figure colored red „pos Kon“). However, levels of DeltaDelta-CT during third week indicate an absolutely effective protection of the filter film against common deletion of the mtDNA.

**Effectiveness of UV-Filter Films for the protection of sun-induced premature skin aging**

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**Results of study**

The different HelioVital filter films protect - depended on the model with different transmission spectrums - very effectively to high effectively from mutations of the mitochondrial DNA in skin cells, generated by UVA-radiation, from which it is known that they play a major role in skin aging.

These results proof that the use of HelioVital filter films is highly beneficial. The films are recommended to be used for highly effective protection against damages generated by UVA-radiation.

**Conclusions & perspectives**

Beyond the use of HelioVital filter films as high-efficient protection against skin aging and skin damages caused by UVA radiation, the results of the study promise further use of the protective filter foils in the case of photo therapy of skin diseases (like Psoriasis Vulgaris, Atopic Dermatitis, Vitiligo, etc.) as well as with heliotherapies and climatic therapies.

Anywhere, where natural or artificial light radiation comes to therapeutic application, the associated risks of radiation could be substantially eliminated by using the respective therapy-effective and cost-effective filter films.

Side effects such as Dermatitis Solaris (sunburn, eythema), Photodermatosis (light-allergy), Immunosuppression (reduces the activation or efficacy of the immune system) and chronic damages such as senile lentigo (liver spots), as well as skin carcinomas (common skin cancer), melanoma (malignant tumor) and premature skin aging may be reduced to a large extent. Hence, the bio-positive alleviating and healing effect of natural sunlight could be used without dangerous effects, risks and stresses. This would be of great importance for various general diseases (like Osteoporosis, Diabetes Mellitus, Polymyalgia Rheumatica, Multiple Sclerosis, etc.) where mutation of the mtDNA plays a role in the pathogenesis and there are also references to a causal lack of sunlight (in particular deficit at natural vitamin D) at the same time. More data and studies are needed however to undermine the mechanism and to establish a general role of filtered sunlight in this context.

**Study report:**

[1] Study Report dated: 23. January 2009 „Wirksamkeit von Prototypen von UV-Schutzfolien / UV-Filterfolien bei der Mutation der mtDNS (*Effectiveness of the protection of prototypes of UV filter films / sunscreen films against mutation of mtDNA*)“

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**References:**

[2] K. Lang, W. Bähring, A. Kaddaha, G. Kieninger. Heliotherapie und Hightech: Altes Wissen in neuem Licht – Moderne Breitband-Solartherapien bieten vielfältige Behandlungsoptionen (*Heliotherapie and Hightech: Old knowledge in new light - modern Broadband Solar-Therapies offer various treatment options*), Elsevier, Medical Journal for naturopatic „KiM“ (Komplementäre und Integrative Medizin - *Medical Journal of Complementary and Integrative Medicine*) Volume 49, Issue 10, 09-2008, pp. 7-12 (6) [doi: 10.1016/j.kim.2008.08.008]

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