EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 868

Photoprotection of Personal Handheld Umbrellas

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Introduction & Objectives: While a healthy and active lifestyle may include time in the outdoors, protecting the skin against damaging UV rays is important for preserving skin's vitality. Photoprotection measures may include applying sunscreen, wearing suitable protective clothing, and seeking shade. The use of handheld umbrellas is one method of shading the skin against the sun, however, there is minimal information available on umbrella effectiveness for reducing personal solar exposure.

Materials & Methods: This study examines body-site specific photoprotection provided by umbrellas having a range of diameters and fabric types. Solar exposure was measured with electronic UV meters positioned by the researcher at several parts of the upper body while the researcher walked in a variety of orientations toward the sun and optionally held an umbrella in a range of postures.

Results: The degree of photoprotection varied by umbrella type, body site, and umbrella orientation toward the sun. Larger diameter umbrellas made from synthetic fabric offered the best protection, while smaller diameter paper, cotton, or lace type umbrellas offered very low protection across use patterns. Protection at the forehead and back of neck varied depending on human and umbrella orientation toward the sun, while other body sites, like the chin and chest were only minimally protected by any umbrella geometry or orientation.

Conclusion: While use of certain personal umbrellas can provide some level protection at a limited selection of body sites, they should be considered only as a supplemental level of protection to other more universally effective measures like clothing and SPF.

The contents of this abstract were presented at American Academy Annual Meeting March 8-12, 2024 in San Diego, CA.

EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
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Abstract N°: 936

Variegata porphyria: follow-up of family cases over a period of 33 years

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Introduction & Objectives:

Cutaneous porphyrias are photosensitive dermatoses, of chronic evolution, located on exposed areas of the body. Hereditary porphyrias are diseases each linked to the deficiency of one of the enzymes involved in the metabolic pathway of heme biosynthesis. Variegata porphyria (PV), called South African or mixed, of autosomal dominant transmission, is a rare condition belonging to the group of hepatic porphyrias. The increased elimination of uro- and coproporphyrins in the urine and of copro- and especially protoporphyrins in the stools is due to a deficiency in protoporphyrinogen oxidase. This metabolic disorder is much more accentuated during acute attacks.

Materials & Methods:

Nous rapportons deux cas de PV dans une même famille habitant Tlemcen (Ville de l'Ouest Algérie).

Les patients vus en 1991 (la Mère et son Garçon)

Results:

Histological examination showed a sub-epidemic bubble containing no inflammatory elements with an intact and, in places, atrophic roof. Biologically, severe anemia at 6.8g/100 ml of Hb, hypochromic, microcytic and aregenerative will be corrected by iron treatment. The determination of urinary porphyrins (Pr. Y. Nordmann, Department of Biochemistry, Louis-Mourier Hospital, Colombes) shows a high level of uroporphyrins at 306 nmol/L (N=50) and especially fecal coproporphyrins could not be measured.

Patients seen in 2024, i.e. after 33 years of evolution For the boy now, aged 45, father of two daughters aged respectively 13 and 8 years old without any skin symptoms. For the Father, on the face we note hyperpigmentation dotted with hypochromic macules giving a dirty appearance to the skin. Hypertrichosis was also found on the face.

Conclusion:

Overall, PV can only be expressed by skin signs identical to those of PCT. Given that hepatic microsomal enzyme inducing drugs, in particular barbiturates, sulfonamides, antiepileptics, oral contraceptives and also alcohol are contraindicated in PV, because they can trigger an acute attack, it is necessary to practice before any aspect of PCT, a dosage of fecal and urinary porphyrins, with in the event of an increase in fecal porphyrins, a chromatography of these, which alone allows PCT and PV to be differentiated.

EA DV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 1530

Long-lasting and safe photoprotection using a skin-bioadhesive technology: a proof of concept with a novel M10 skin-bioadhesive UVA filter

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Introduction & Objectives:

Protection against solar UV radiation is a global public health need due to the increasing incidence of skin cancer over the last decades. Innovating in sunscreen is a challenging research and technology effort. Health authorities and consumers support the use of safe sunscreens that are highly protective, without causing adverse environmental effects. Organic UV filters, while providing great cosmetic advantages, require frequent re-application, may penetrate the skin, and their release in the aquatic environment can have a significant impact on the marine ecosystem with special impact on coral. Based on breakthrough skin-bioadhesive technology, we are developing new organic UV filters that bind to the stratum corneum.

Materials & Methods:

Skin-bioadhesive technology is based on the generation of innovative molecules linking a core of known commercial UV filters to a bioadhesive group that binds to thiols at the surface of the skin. Among new UV filters developed with this technology, the UVA DHHB (diethylamino hydroxybenzoyl hexyl benzoate)-derived bioadhesive UV filter, M10, was formulated for skin explants and human clinical tests. The efficacy and safety of M10 bioadhesive filter were evaluated *in vitro* and *ex vivo* using UV spectrum analysis, skin autofluorescence, UVA imaging, diffusion cell permeation and Raman confocal spectroscopy. The persistence of photoprotection over time was analyzed *in vivo* in a clinical study using UVA imaging facilities on human volunteers' arms.

Results:

Comparison of M10 to DHHB formulated at the same molar concentration on the same chassis demonstrated superiority of the bioadhesive M10 with respect to efficacy, persistence, resistance and lack of skin permeation on *in vitro* and *ex vivo* experiments. Most importantly, the long-lasting photoprotection of M10 was observed *in vivo* in a clinical study on human volunteers as a human proof of concept of the technology. M10 showed a good tolerance, resistance to rubbing, reduced transversal skin diffusion and a persistence of photoprotection: M10 was 58% more protective than DHHB, with 63% persistence 6 hours after application.

Conclusion:

Studies with a novel UVA M10 UV filter demonstrated that skin-bioadhesive technology can bind organic UV filters to the skin surface and the chemically modified UV filter persists in the stratum corneum with no accumulation in deeper skin layers, while preserving the active protective spectrum. We clinically observed a long-lasting photoprotective effect over 6 hours, substantially longer than the recommendation to reapply sunscreen every two hours. Resistance to rubbing was also demonstrated. In addition to M10, other UVA and UVB skin-bioadhesive filters are being developped. The development of safe and long-lasting skin-bioadhesive UV filters could be a major advance in photoprotection research that the industry has been seeking over the past 20 years.

EA DV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 1764

The regulatory effect of LGALS1 on programmed cell death in UVB-induced skin photodamage

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Introduction & Objectives:

Acute photodamage is characterized by erythema, edema, and pigmentation after acute exposure to ultraviolet radiation (UVR). UVB is known as the main cause of photodamage. With prolonged exposure time, it may lead to irreversible conditions including photoaging and skin cancer, posing a threat to public health. Therefore, further exploration of the molecular targets is of great importance to elucidating pathogenic mechanisms and developing therapeutic strategies. However, the multi-omics atlas of photodamage was still not fully established. Programmed cell death (PCD) plays an important role in maintaining skin immunity and homeostasis. Nevertheless, the molecular regulatory mechanism of PCD in skin photodamage remains elusive. Therefore, the aims of this study are (1) adding to the multi-omics data of skin photodamage; (2) screening potential key target genes and cell types in skin photodamage; (3) validating the key target gene and further verifying its regulatory effects on PCD in UVB-induced skin photodamage.

Materials & Methods:

The changes in transcriptome of various cell types were identified using single-cell RNA sequencing (scRNA-seq). The changes in whole transcriptome of human keratinocytes were identified using RNA-seq. Bioinformatics analyses were performed by R software. The expression of target genes was examined using qPCR and immunohistochemistry. Human keratinocytes with LGALS1 overexpression or knockdown were used as the in vitro models. Flow cytometry, immunofluorescence, and western blotting were used to examine the ROS level, apoptosis, and autophagy.

Results:

The TOP 10 DEGs of various cell types in UVB-induced skin photodamage were shown in Figure 1A. The main cell types with major transcriptome changes were shown in Figure 1B. The GO and KEGG enrichment of the DEGs were shown in Figure 1C and Figure 1D. Figure 1E showed the TOP 5 genes which were most associated with the pseudo-time analysis. The DEGs of human keratinocytes in photodamage were shown in Figure 1F, 1H. The GO and KEGG enrichments were shown in Figure 1G, 1I. The PPI network and GSEA analysis were shown in Figure 1J-1K. In vivo and in vitro experiments showed significant upregulation of LGALS1 expression in photodamaged skin (Figure 2A, 2C) and keratinocytes (Figure 2B). Stable LGALS1 overexpression cell lines were constructed (Figure 2D-2F); knockdown of LGALS1 was performed by siRNA (Figure 2G). LGALS1 knockdown upregulated the UVB-induced ROS production (Figure 2H) and apoptosis (Figure 2I), while LGALS1 overexpression decreased apoptosis (Figure 2I). LGALS1 knockdown supressed the UVB-induced autophagy flux (Figure 2J). LGALS1 overexpression upregulated the UVB-induced autophagy, indicated by the increased LC3BII/LC3BI (Figure 2K).

Conclusion:

LGALS1 may play a positive role in regulating programmed cell death in UVB-induced skin photodamage.

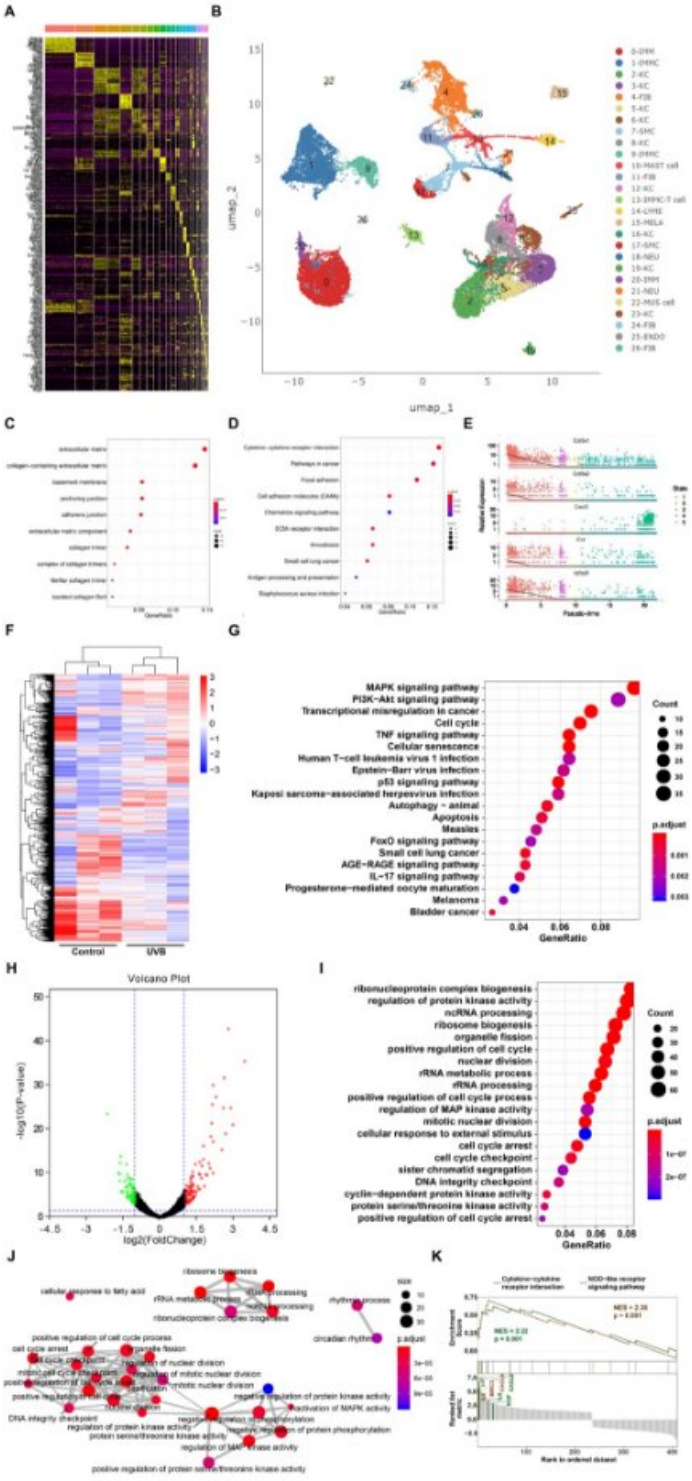
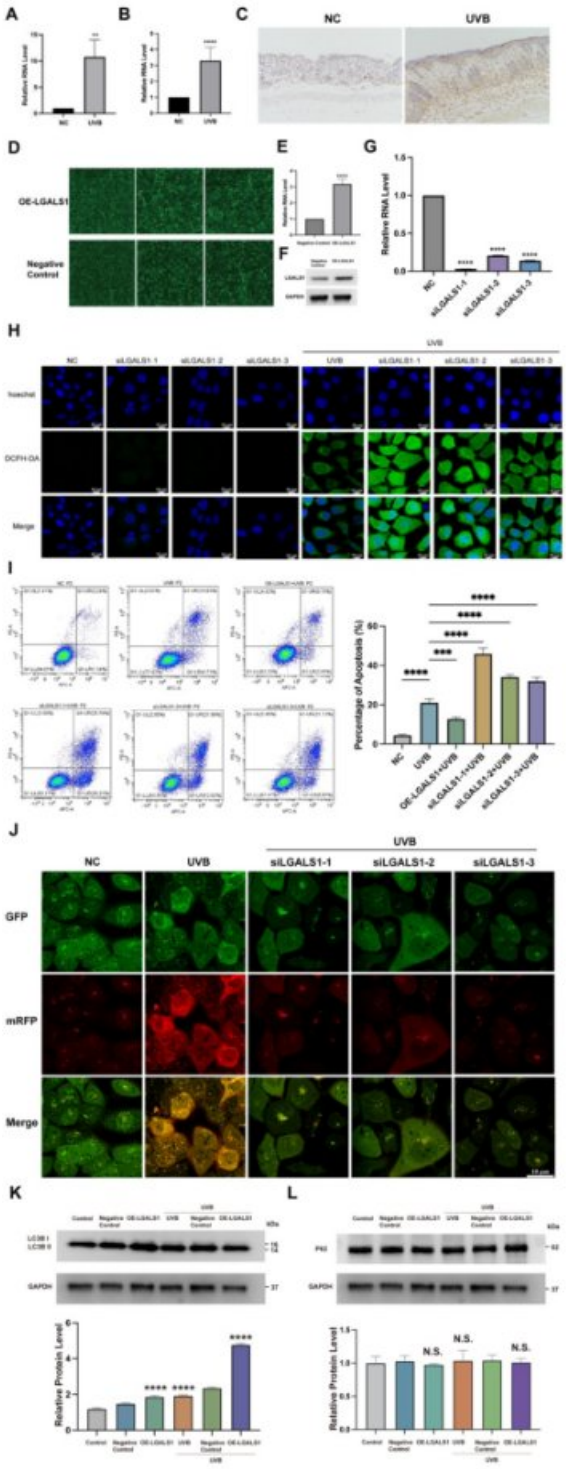

A
B
umap_1
umap_2
C
D
E
F
Control
UVB
G
MAPK signaling pathway
PI3K-Akt signaling pathway
Transcriptional misregulation in cancer
Cell cycle
TNF signaling pathway
Cellular senescence
Human T-cell leukemia virus 1 infection
Epstein-Barr virus infection
p53 signaling pathway
Kaposi sarcoma-associated herpesvirus infection
Autophagy - animal
Apoptosis
Measles
FoxO signaling pathway
Small cell lung cancer
AGE-RAGE signaling pathway
IL-17 signaling pathway
Progesterone-mediated oocyte maturation
Melanoma
Bladder cancer
GeneRatio
Count
p.adjust
H
Volcano Plot
-log10(P-value)
log2(FoldChange)
I
ribonucleoprotein complex biogenesis
regulation of protein kinase activity
ncRNA processing
ribosome biogenesis
organelle fission
positive regulation of cell cycle
nuclear division
rRNA metabolic process
rRNA processing
positive regulation of cell cycle process
regulation of MAP kinase activity
mitotic nuclear division
cellular response to external stimulus
cell cycle arrest
cell cycle checkpoint
sister chromatid segregation
DNA integrity checkpoint
cyclin-dependent protein kinase activity
protein serine/threonine kinase activity
positive regulation of cell cycle arrest
GeneRatio
Count
p.adjust
J
ribosome biogenesis
cellular response to fatty acid
rRNA metabolic process
rRNA processing
ribonucleoprotein complex biogenesis
positive regulation of cell cycle process
cell cycle arrest
organelle fission
cell cycle checkpoint
nuclear division
regulation of nuclear division
mitotic cell cycle checkpoint
regulation of mitotic nuclear division
positive regulation of cell cycle
mitotic nuclear division
positive regulation of cell cycle
sister chromatid segregation
regulation of protein kinase activity
DNA integrity checkpoint
regulation of protein kinase activity
protein serine/threonine kinase activity
regulation of MAP kinase activity
positive regulation of protein serine/threonine kinase activity
rhythmic process
circadian rhythm
p.adjust
size
K
Cytokine-cytokine receptor interaction
NOD-like receptor signaling pathway
Enrichment score
Ranked list metric
Rank in ordered dataset

Figure 1


A
B
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NC
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OE-LGALS1
Negative Control
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NC
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siLGALS1-2
siLGALS1-3
H
UVB
Hoechst
DCFH-DA
Merge
I
Percentage of Apoptosis (%)
NC
UVB
OE-LGALS1+UVB
siLGALS1-1+UVB
siLGALS1-2+UVB
siLGALS1-3+UVB
J
NC
UVB
siLGALS1-1
siLGALS1-2
siLGALS1-3
GFP
mRFP
Merge
K
L
GAPDH
Relative Protein Level
N.S.

Figure 2

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AMSTERDAM 25-28 SEPTEMBER 2024
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Abstract N°: 1893

Narrowband ultraviolet B phototherapy for generalized granuloma annulare: Real-life experience

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Introduction & Objectives: Generalized granuloma annulare (GA) is a rare, inflammatory granulomatous skin disease. Phototherapy is suggested as a first line therapy. There are more data about psoralen ultraviolet A than narrowband ultraviolet B (NB-UVB) in generalized GA in literature. We aimed to evaluate the effectiveness and safety of NB-UVB in generalized GA.

Materials & Methods: In this observational, retrospective study, 11 generalized GA patients who received NB-UVB between 2013 and 2023 were evaluated. Data about the patients were obtained from phototherapy unit and clinical follow-up forms.

Results: Eleven patients, 10 (90.9%) female and 1 (9.1%) male were included in the study. The mean age of the patients was 57.6±7.92 years. The mean disease duration was 26.9±27.9 weeks. 3 (27.2%) of the patients had interstitial GA. NB-UVB therapy caused to complete response in 18.2% of the patients and partial response in 81.8%. The mean number of NB-UVB sessions was 36.4±13.8. The mean cumulative dose was 37.1±25.6 J/cm2. There was no significant difference in mean number of sessions and cumulative dose according to NB-UVB response ($p>0.05$). NB-UVB was extremely well tolerated. After phototherapy, patients were followed for at least 6 months. No relapse was observed in any of them.

Conclusion: NB-UVB is an effective and safe treatment option in generalized GA.

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AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 1931

Utilising digital patient questionnaires and patient-reported outcome measures (PROMs) in phototherapy: an observational descriptive study of 772 patients.

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Introduction: Phototherapy is a safe and cost-effective treatment for several severe inflammatory skin disorders. To improve the efficiency of phototherapy assessments and better understand patients' disease activity and quality of life (QoL) before phototherapy, we designed digital phototherapy-specific patient questionnaires. Herein, we present a descriptive observational study of the clinical characteristics and QoL assessments of 772 patients treated with phototherapy between June 2020 and December 2022.

Methods: Data for this study were collected as part of an ongoing service improvement project and are consequently exempt from ethical approval requirements.** Before starting phototherapy, patients completed digital questionnaires, which incorporated demographic and clinical questions as well as patient-reported outcome measures (PROMs). PROMs collected included the Dermatology Life Quality Index (DLQI), the five-point Patient Global Assessment (PtGA) and the 11-point Itch Numeric Rating Scale (INRS) for those reporting itchiness [1-3].

Results: The median (M) age was 37 years (interquartile range [IQR] 28-52) with 93.9% of patients being adults and 51.5% female. From patients with available skin type data (n=503), 51% identified themselves as skin type V-VI based on the Fitzpatrick Skin Type questionnaire. A significant proportion (41.4%) travelled more than 20 km for each treatment session. 91% of patients had narrowband ultraviolet B treatment and, overall, psoriasis was the most frequently treated condition (38.5%), followed by eczema (28.2%), vitiligo (14.1%), mycosis fungoides (4.7%), polymorphic light eruption (4.3%), morphoea (3%), nodular prurigo (1.3%), pruritus (1%), lichen planus (0.9%), and other diagnoses (4%). Median PtGA disease severity was moderate across all inflammatory skin disorders. The median DLQI was very high for psoriasis (M: 13, IQR [8, 18]), eczema (M: 13, IQR [8, 19]), nodular prurigo (M: 16, IQR [8, 19]), pruritus (M: 12, IQR [7, 19]) and lichen planus (M: 16, IQR [6, 23]), and moderate for vitiligo (M: 7, IQR [3, 13]), mycosis fungoides (M: 3, IQR [2, 10]) and morphoea (M: 5, IQR [2, 12]). INRS severity was moderate for eczema (M: 6, IQR [4, 7]), psoriasis (M: 6, IQR [3, 7]) and nodular prurigo (M: 7, IQR [5, 8]), and severe for pruritus (M: 8, IQR [5, 9]). Finally, most patients (87%) found the questionnaires easy to complete.

Conclusion: Our study demonstrates the benefits of using digital patient questionnaires in routine phototherapy practice. Importantly, these assessments provided a patient-orientated measure of disease severity and QoL before starting phototherapy. The significant travel distances required by some patients to access our phototherapy unit also indicate the importance of establishing new phototherapy facilities, particularly in areas with limited accessibility.

References

\1. Finlay AY, Khan G. Dermatology Life Quality Index (DLQI)—a simple practical measure for routine clinical use. Clinical and experimental dermatology. 1994; 19(3): 210-216.

\2. Perez-Chada L, et al. Achieving consensus on patient-reported outcome measures in clinical practice for inflammatory skin disorders. J Am Acad Dermatol. 2023;88(1):86-93.

\3. Phan NQ, et al. Assessment of pruritus intensity: prospective study on validity and reliability of the visual

analogue scale, numerical rating scale and verbal rating scale in 471 patients with chronic pruritus. Acta dermato-venereologica. 2012; 92(5): 502-507.

EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
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Abstract N°: 2109

Efficacy of oral PUVA therapy for the treatment of chronic cutaneous graft versus host disease: A retrospective study analysis from a tertiary care center.

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Introduction & Objectives:

Cutaneous graft versus host disease (GVHD) is a well recognized complication, occurring in 60-80 % of patients after allogenic bone marrow stem cell transplantation (BMSCT). It occurs in two forms : acute or chronic. The chronic type manifests as either lichenoid or sclerodermatous form. Phototherapy is an effective treatment option as it works by immunomodulatory effects.

This study primarily aimed to evaluate the efficacy and safety of oral PUVA (psoralen with UV-A) therapy in patients diagnosed as chronic cutaneous GVHD. The secondary objective was to assess the percentage reduction in the dose of oral steroids or other immunosuppressants after receiving oral PUVA therapy.

Materials & Methods:

We retrospectively reviewed eight cases of chronic cutaneous GVHD. All the patients had undergone allogenic BMSCT for an underlying haematological disorder at a tertiary care center in western India. Each patient was administered phototherapy with UV A light twice a week. All of them received 8-methoxypsoralen at a dose of 0.6mg/kg as a photosensitizer, two hours prior to UV A therapy. The percentage improvement in body surface area involved was calculated at the end of therapy and results were analyzed using the SPSS version. Also, the dose of steroids and immunosuppressants were tapered while the patient was on phototherapy.

Results:

Out of the total eight patients enrolled in the study, five were males (62.5%) and three (37.5%) were females. The mean age at the time of presentation was 37.75 years. Five patients (62.5%) had lichenoid GVHD, while the other three (37.5%) cases had sclerodermatous type. Six patients had undergone allogenic BMSCT for leukaemia, while one patient had myelofibrosis and one case was diagnosed with Diamond Blackfan syndrome. The mean time to develop GVHD after bone marrow transplant was 9.5 months and the mean body surface area involved at the time of diagnosis was 50.63%. There was more than 50% improvement in five cases (62.5%) after an average of 36.25 sessions of PUVA, while one case (12.5%) relapsed after achieving complete remission. One patient (12.5%) was lost in follow up as he was not able to frequently visit the hospital for twice a week sessions. One patient (12.5%) died while on PUVA therapy due to relapse of leukaemia. Generally, all the patients tolerated PUVA well, except two patients who experienced nausea after taking psoralen, one patient had dizziness after PUVA therapy and one patient complained of pigmentation of skin over the extremities. The percentage reduction in the dose of steroids or other immunosuppressants before and after phototherapy was also found to be statistically significant.

Conclusion:

We hereby conclude that PUVA therapy is an effective non aggressive modality for treating chronic cutaneous GVHD, especially the lichenoid form. It offers a major advantage of immunosuppressive sparing effect as well as a good safety profile.

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AMSTERDAM 25-28 SEPTEMBER 2024
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Abstract N°: 2238

Assessment of skin fluorescence in actinic keratoses of the face treated with photodynamic therapy with and without an emollient containing urea 10%, shea butter, glycerin, mannose and thermal water: a split-face study.

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Introduction & Objectives:

Methyl Aminolevulinate photodynamic therapy (MAL-PDT) is a usually preceded by

curettage to remove crusts and scales of actinic keratosis.

The procedure is often accompanied by pain and bleeding and is therefore poorly tolerated by the patient.

Curettage is nevertheless indicated to promote greater penetration of the photosensitizer and thus ensure the effectiveness of the treatment.

Assessing the penetration of Methyl Aminolevulinate (MAL) in conventional photodynamic therapy (PDT) performed without curettage but after pretreatment with a topical keratolytic emollient containing urea 10%, shea butter, glycerin, mannose and thermal water, which for brevity we will henceforth call as keratolytic product (KP).

Materials & Methods:

Patients with multiple garde I e II actinic keratoses of the face were enrolled in a split-face study.

Half of each patient's face was randomized for the application of the keratolytic product, once daily for two weeks before MAL-PDT.

The remaining part of the face was treated with PDT without the application of any topic.

No curettage was performed.

The fluorescence emitted after 3 hours of MAL incubation was evaluated by a blinded investigator using a visual score from 0 to 10 after illumination with a Wood's lamp.

Results:

Thirty-six patients were included in the study.

The fluorescence emitted in the areas pretreated with the keratolytic product was found to be statistically higher compared to the control areas ($p<0.001$).

Conclusion:

Considering the intensity of fluorescence emitted as proportional to the ability of MAL

penetration into the skin and thus to the effectiveness of the treatment, pretreatment with

the keratolytic product has been shown to be effective in enhancing the effect of MAL-PDT even in the

absence of curettage.

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AMSTERDAM 25-28 SEPTEMBER 2024
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Abstract N°: 2654

Ferulic acid as a bifunctional antioxidant and iron chelator for skin photoprotection

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Introduction & Objectives:

Exposure of skin fibroblasts to solar UVA radiation results in excess generation of reactive oxygen species (ROS) and the release of potentially harmful cytosolic labile iron (LI), thereby causing oxidative damage to cell components which if remained unrepaired, can lead to necrotic cell death. The pre-treatment of cells with synthetic iron chelators has been shown to be protective against UVA-induced cellular damage by depleting the intracellular labile iron pool (LIP) of skin cells. However, because of the potential toxicity of synthetic chelators, currently there is a clear need to identify natural antioxidants that possess iron-chelating properties in addition to their antioxidant properties. This will allow to both sequester ROS and adjust excess free LI released after exposure of skin cells to damaging doses of UVA component of sunlight. Ferulic acid (FA) is known to exhibit antioxidant activities in vitro and in vivo. Based on its chemical structure, it is also expected to exhibit iron chelating properties. However, no research to date has been conducted on measuring its iron chelating capacities in skin cells.

Materials & Methods:

The present study aimed therefore to assess the photoprotective efficacy of this natural compound against UVA-induced oxidative damage in cultured human primary skin fibroblasts by assessing its ability to chelate the intracellular LI. Cultured human primary skin fibroblasts were treated with FA at a series of concentrations up to 100 µM for 24 hours. MTT cytotoxocity assay was performed 24 hours after irradiation of cells with UVA broad spectrum Sellas lamp (340-400 nm, Germany) up to a highest dose of 500 kJ/m2. The cytosolic LIP was measured from 1 to 24 hours after UVA irradiation (or not) with a highly sensitive iron sensor recently developed by us (Hider et al, 2023, Molecules 28(18):6467) .

Results:

These treatments demonstrated a significant reduction in basal cytosolic LIP of FA-reated skin fibroblasts when compared to untreated cells. The reduction in cytosolic LIP was also observed after UVA radiation of FA-treated cells and this correlated with the photoprotective role of the compound up to a high UVA dose of 500 kJ/m2, when compared to untreated and unirradiated control fibroblasts.

Conclusion:

This is the first study to report the dual functions of FA as an iron-chelator and an antioxidant against UVA-induced oxidative damage in skin cells.

EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 2847

LC-MS/MS metabolomics reveal serum metabolic signature of chronic actinic dermatitis.

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Introduction & Objectives:

To investigate metabolomics in patients with chronic actinic dermatitis (CAD), and to search for serum diagnostic biomarkers of CAD.

Materials & Methods:

A retrospective analysis was conducted. Serum samples were collected from 46 patients with CAD and 16 age-and gender-matched healthy controls in the Guangzhou Institute of Dermatology from April 2011 to December 2021. Changes in serum metabolomics and expression were assessed by LC-MS/MS Analysis.

Principal component analysis, partial least squares discriminant analysis, and orthogonal partial least squares discriminant analysis were performed to screen differential biomarkers, Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment analysis was used to screen metabolic pathways, and receiver operating characteristic (ROC) curve analysis was conducted to screen diagnostic markers. Comparisons of the age and gender distribution between groups were performed using t test and chi-square test, respectively.

Results:

The 46 CAD patients were aged from 30 to 84 (60.39 ± 10.52) years, including 41 males and 5 females; the 16 healthy controls were aged from 50 to 89 (59.81 ± 10.72) years, including 14 males and 2females; there were no significant differences in the age or gender distribution between the two groups (age: $t = 0.19$, $P = 0.853$; gender: $\chi 2 = 0.03$, $P = 0.859$). A total of 1,873 metabolites were identified in the serum samples, with 174 differential metabolites between the two groups of CAD patients as well as healthy controls, of which 36 metabolites were up-regulated and 52 metabolites down-regulated in the positive ion mode, and 23 metabolites were up-regulated and 63 metabolites down-regulated in the negative ion mode. Differential metabolites were mainly enriched in protein digestion and absorption, central carbon metabolism in cancer, aminoacyl-tRNA biosynthesis, choline metabolism in cancer, glutathione metabolism. 15 metabolites such as 1-oleoyl-sn-glycero-3-phosphocholine (LPC) and artemisinin , had areas under the ROC curve (AUCs) were all > 0.95 when used as diagnostic markers.

Conclusion:

There were significant differences in metabolism between CAD patients and healthy controls groups, LPC and artemisinin and 15 other metabolites have good diagnostic efficacy for CAD.

EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 3210

Koebnerization in Polymorphous Light Eruption- A Novel Case Report

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Introduction & Objectives: Polymorphous light eruption (PMLE) is an idiopathic condition marked by erythematous papules, vesicles or patches on skin exposed to light, often affecting the backs of hands and forearms. In a male patient with PMLE, we noticed a phenomenon where typical lesions appeared along tattoo marks on the other side of the forearm, known as the Koebner's phenomenon. This association of PMLE with Koebnerization has been documented in very few cases in the world previously and hence would like to present the same to widen the understanding of photodermatitis.

Materials & Methods: A 28 year old male presented with complaints of redness and rashes on the sun-exposed site of the left forearm that were also itchy for the past two weeks. He complained of burning sensation over these lesions on exposure to sun. There was no significant past history. On examination, multiple scattered as well as grouped skin-coloured to erythematous papules were present over the sun exposed areas of the left forearm (dorsal aspect). On examination of the ventral aspect of these lesions, his tattoo marks in the involved region showed scaling, erythema and lichenification which signifies the koebnerization of the PMLE lesions. A biopsy was done on these lesions which further confirmed the occurrence of koebnerization of PMLE lesions over this tattoo marks.

Results: This is a novel case showing incidental finding of koebnerization occurring over the tattoo lesions of a patient presenting with complaints of symptoms suggesting polymorphous light eruption.

Conclusion: In Conclusion, Koebnerization is known to occur in several diseases in dermatology namely psoriasis, vitiligo and verruca vulgaris. The causation of this could be due to auto-inoculation of the involved organism, or due to triggers as in psoriasis or in the line of trauma such as warts. This was a novel case to present as presentation of koebnerization in polymorphous light eruption is an extremely rare occurrence with very few cases reported in the literature previously. Hence this case has been reported here for its rarity and for further research to be done in this direction to expand the knowledge in dermatological science.

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AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 3213

Sun protection products protect against UV-induced mitochondrial DNA damage in human dermal fibroblast skin cells

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Introduction & Objectives:

Many studies have implicated the key role of mitochondria (the batteries of the cell) in the process and mechanism of ageing, particularly the role of oxidative stress and mitochondrial dysfunction in both normal skin ageing and skin photoaging. Mitochondrial DNA (mtDNA) has been established as a reliable and sensitive biomarker of UV-induced damage in the skin. This is due to its absence of protective histones, limited repair mechanisms, and its presence as multiple copies within a cell. A quantitative real-time PCR (qPCR) assay of a specific "1kb UV-hotspot damage region" is used to measure mtDNA damage as qPCR amplification efficiency is decreased in the presence of high levels of UV-induced mtDNA damage.

Objective: do commercial sun protection products provide protection by reducing the amount of UV-induced mtDNA damage in human dermal fibroblast skin cells.

Materials & Methods:

Four different sun protection products (all SPF 50) at 2mg/cm2 were suspended on a UV transparent support between the cultured human skin cells and the UV source. The skin cells were irradiated in 35mm dishes using 2 standard erythemal doses (SED) of UV light. To represent 100% protection (negative control), dishes were wrapped in aluminium foil, and to represent 100% exposed, no product was used (positive control). A sham control was a cream with no SPF. The mtDNA damage qPCR assay of a 1kb UV-hotspot region was determined in triplicate for each of the three biological repeats of the individual sun protection products. An additional 83bp qPCR mtDNA assay was performed for each condition to ensure equal loading of mtDNA in the damage qPCR assay.

Results:

MtDNA damage was significantly greater ($P<0.0028$) when the cells were exposed to 2 SED solar UV (100% exposed, positive control) compared to when the cells were completely foil-covered (100% protected, negative control). The key finding was that all four sun protection products showed a similar degree of UV protection of mtDNA compared to the 100% exposed cells, as seen by decreasing the level of mtDNA damage. This degree of protection (expressed as Ct values) equates to 3.2 fold less mtDNA damage, or 320% protection, compared to exposed cells and was** statistically significant for all four products ($P\leq0.02$).

Conclusion:

This set of experiments investigated four sun protection products (all SPF 50) in terms of their potency of protection against UV-induced mtDNA damage with the products in between the light source and the human skin cells. The statistically significant results clearly demonstrate in cultured human skin cells, the high potency of protection of all four SPF products against UV-induced mtDNA damage which is an established biomarker of UVR damage in human skin ageing. This finding shows that the SPF products protect against damage to the DNA housed inside the batteries of the cell thereby helping to combat skin fatigue and promote increased bioenergy in

human skin.

EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 3536

Exploring the efficacy of Excimer lamp combined with minipulse steroids in the treatment of Vitiligo

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Introduction & Objectives:

Vitiligo is a common skin condition that causes skin pigmentation loss, which can significantly impact a person's mental and social well-being. Several topical and light therapies are available for repigmentation, but they require prolonged treatment durations and may have unwanted side effects. The excimer lamp is a newer therapy that can stimulate pigmentation regrowth quickly without exposing the entire body to radiation. This case series provides additional evidence for using excimer laser therapy, especially for facial vitiligo.

Materials & Methods:

This study involved individuals with significant loss of pigmentation on their faces who received excimer laser therapy twice a week and weekly mini pulse steroids until they achieved noticeable pigmentation restoration. The study was conducted at the outpatient dermatology clinic in Thrissur, Kerala. Ninety-eight participants with Fitzpatrick skin types IV to V were selected. These individuals had previously used various topical therapies, such as steroids and calcineurin inhibitors, but had not received light therapy before the trial. The primary measurement used was the percentage of repigmentation determined through visual estimation. The mean radiation dosage, number of treatments, and duration of therapy were also recorded.

Results:

All 98 patients in the study had over 75% repigmentation of their facial vitiligo after receiving treatment for 60-90 days.

Conclusion:

The excimer laser is an effective treatment for vitiligo, and it may produce results faster than other commonly used procedures. The rapid response may be related to skin type, but further research is needed to understand this association better.

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AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 4670

Efficacy of an antioxidant mix aged over time in preventing skin damage induced by UV exposure

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Introduction & Objectives: Extrinsic skin damage is often a result of oxidative stress caused by exposure to environmental factors such as ultraviolet (UV) radiation, ozone (O3), and various pollutants. As a result, topical antioxidants have been evaluated for their effectiveness in mitigating or reversing skin damage caused by environmental factors. Topical antioxidants containing a combination of l-ascorbic acid, tocopherol, and ferulic acid, have significantly improved markers of skin health after exposure to environment-induced skin damage. It has been shown that ferulic acid significantly improves the stability of both l-ascorbic acid and tocopherol, but its long-term stabilization effects on these antioxidants are relatively unknown. This study evaluated the time-dependent effectiveness of a topical antioxidant mix containing 15% l-ascorbic acid, 1% tocopherol, and 0.5% ferulic acid on oxidative skin damage.

Materials & Methods: Skin biopsies (12mm, n=60) were placed in a 6-well plate with medium and incubated at 37°C and 5% CO2 overnight. The day after skin samples were pretreated with 10µl of differently-aged (0-, 6-, 12-, and 36-month-old) antioxidant mix and then exposed to different doses of UV light (100, 200, 400 mJ/cm2) daily over four days. After the last exposure (4th day) the samples were harvested and processed for immunofluorescence analysis.

Results: This study evaluated 4-HNE and 8-OHdG as oxidative damage and skin DNA damage markers, respectively and NRF2/HO1 levels as marker of antioxidant response to damage. UV exposure significantly increased 4-HNE levels in human skin explants. In addition, the levels of Filaggrin and Collagen 1 were also decreased after UV exposure while the inflammatory marker IL-8 was significantly induced by UV. Pre-treatment with the antioxidant formulation, particularly in its younger formulations (0-, 6-, and 12-month-old), significantly reduced 4-HNE levels, demonstrating its protective potential against oxidative damage. Additionally, all antioxidant formulations effectively mitigated UV-induced DNA damage across all doses and prevented collagen 1 and filaggrin loss. In addition, NRF2/HO1 levels were clearly upregulated by UV exposure and significantly reduced when the antioxidant mix was applied.

Conclusion: This study investigated the effectiveness of differently-aged topical antioxidant formulations containing 15% l-ascorbic acid, 1% tocopherol, and 0.5% ferulic acid on oxidative skin damage. The results indicate that pre-treatment with this formulation consistently reduces UV-induced oxidative damage and DNA damage in human skin explants, regardless of the formulation age. However, the effectiveness of aged formulations may be limited in cases of extreme UV exposure. These results support ferulic acid as a stabilization agent for topical antioxidant mixtures.

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EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 4674

Unveiling Thermal Effects in Pulsed Dye Laser Treatment of Psoriasis: Insights from In Silico, In Vitro, and Ex Vivo Investigations

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Introduction & Objectives:

Psoriasis is characterized by an increase in the proliferation of keratinocytes and nerve fiber activity, contributing to the typical skin lesions. Pulsed Dye Laser (PDL) treatment of psoriatic lesions can cause remission but its mechanism remains unclear. One hypothesis is that PDL causes thermal damage by the diffusion of heat to neighboring structures in lesional skin. There is limited information on the thermal sensitivity of these neighboring skin cells when exposed to hyperthermia. The objective of this study was to provide estimates of these physical effects to identify structures prone to thermal damage that may be affected by PDL treatment.

Materials & Methods
In silico: We modeled the laser light propagation and subsequent photothermal heating by numerically solving the transient diffusion and heat equations simultaneously. To this end, we used the finite element method in conjunction with an image-derived psoriatic lesion morphology (which was defined by segmenting blood vessels from a confocal microscopy image of a fluorescently labeled section of a 3 mm punch biopsy of a psoriatic lesion). The resulting predictions of the generated temperature field within the lesion were then used to assess the possibility of stalling or arresting some suspected pathogenic processes.
In vitro: Cultured human endothelial cells, smooth muscle cells, neuronal cells, and keratinocytes were exposed to various time (2-20s) and temperature (45–70°C) combinations. Cell viability was assessed by measuring intracellular ATP content 24 hours after thermal exposure and this data was used to calculate fit parameters for the Arrhenius and CEM43.
Ex vivo: Rat mesenteric arteries were subjected to temperatures in the range of 40-65°C for 30 seconds after which we assessed the functionality of the blood vessel through wire myography technique. Through different chemical or electrical stimuli we were able to specifically target each cell type, including endothelial cells, smooth muscle cells, and perivascular nerves. Non-linear regression was used to fit our dataset to obtain the temperature needed to reduce blood vessel function by 50%.

Results It is conceivable that perivascular nerves are thermally denatured, as almost all locations that reach 60°C were found to be within 18 µm (at 585 nm) and 11 µm (at 595 nm) of a blood vessel wall (Fig 1-3). Our *in vitro* results show that survival of neuronal cells and keratinocytes was significantly less than that of endothelial and smooth muscle cells at 55-60°C (Fig 5,6). Ex vivo data showed that blood vessel functionality decreases significantly when exposed to temperatures between 55°C-60°C for 30 seconds (Fig 7-8).

Conclusion The results imply that it is likely that PDL causes thermal damage to the environment through temperature increases that show a decrease on cell viability and blood vessel functionality. Damage to these perivascular cells (nerves, keratinocytes) may aid in modulating the neuro-inflammatory pathways in psoriasis. These data provide insight into the potential mechanisms of PDL therapy for psoriasis and advance our understanding of how thermal effects may play a role in its effectiveness. The presented approach constitutes a useful tool to provide realistic estimates of the photothermal effects of PDL treatment of psoriatic plaques yielding information that is essential in guiding future experimental studies toward unraveling the remedial mechanisms of

these treatments.

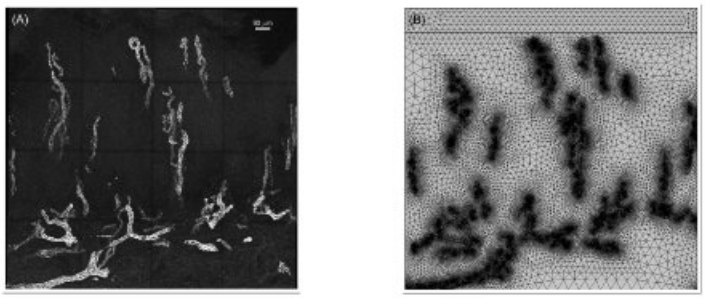

Fig. 1 Psoriatic lesion morphology used for thefinite element method calculations. Confocalfluorescence microscopy image of a psoriaticlesion

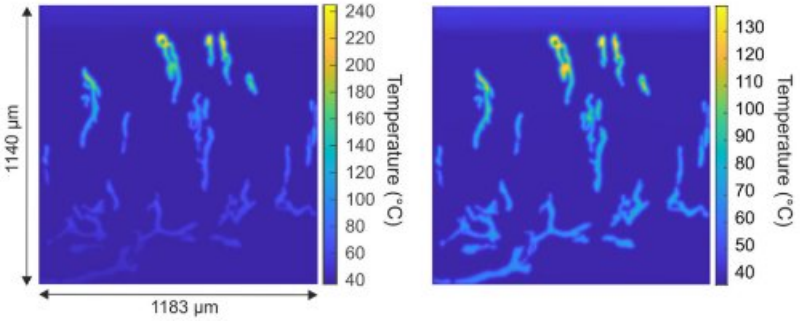

Fig. 2 Temperature distribution. Generated temperaturefield at the end of a 0.45 ms continuous laser pulse at 585 nm (left) and at 595 nm(right) and incident radiant exposure of 8 J cm−2. Note the difference in the temperature scale.

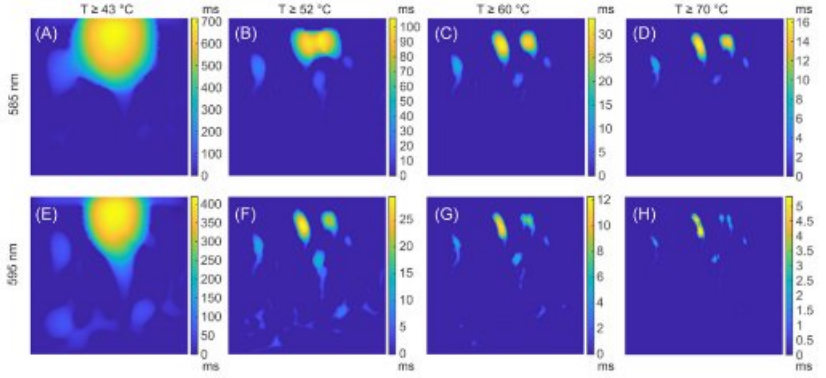

Fig. 3 Spatial maps showing the consecutive durations for which the pre-set critical temperatures (columns) are sustained from thebeginning of a 0.45 ms continuous laser pulse at 585 nm (panels A–D) and 595 nm (panels E–H) and an incident radiant exposure of 8 J cm−2.Note the different color scales indicating the consecutive duration in ms.

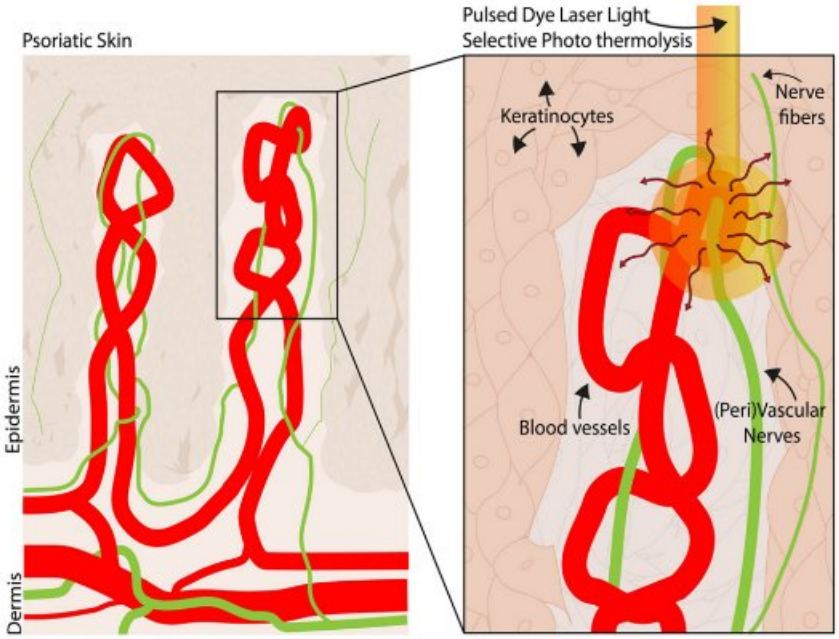

Fig 4 Illustration of heat diffusion of pulsed dye laser light from the blood vessels where the chromophore oxyhemoglobin resides towards the surrounding areas. These could include the (peri)vascular nerves, free nerve fiber endings, and keratinocytes.

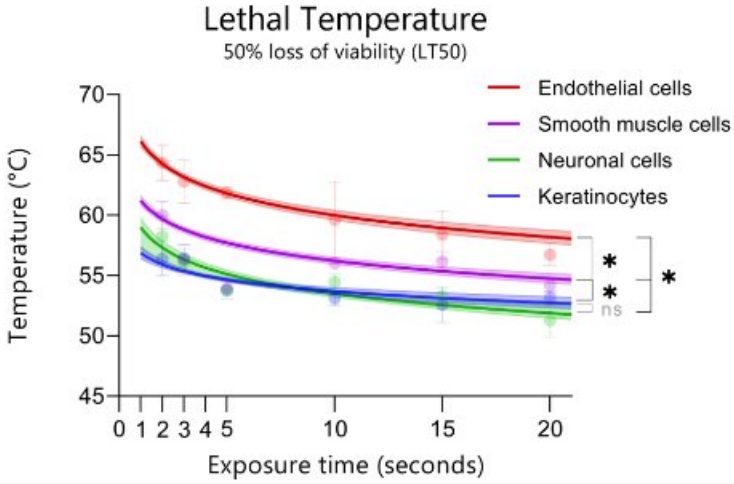

Fig 5 Temperature and time combinations that result in reduction of cell viability by 50% (LT50) of the linear interpolated points (symbols, n=9, median with 95%CI) and the fitted LT50s using the Arrhenius model (lines, median, 95% CI, n=5000). Significance levels of differences between the cell types are indicated with * for $p<0.0001$ at $\alpha=0.05$

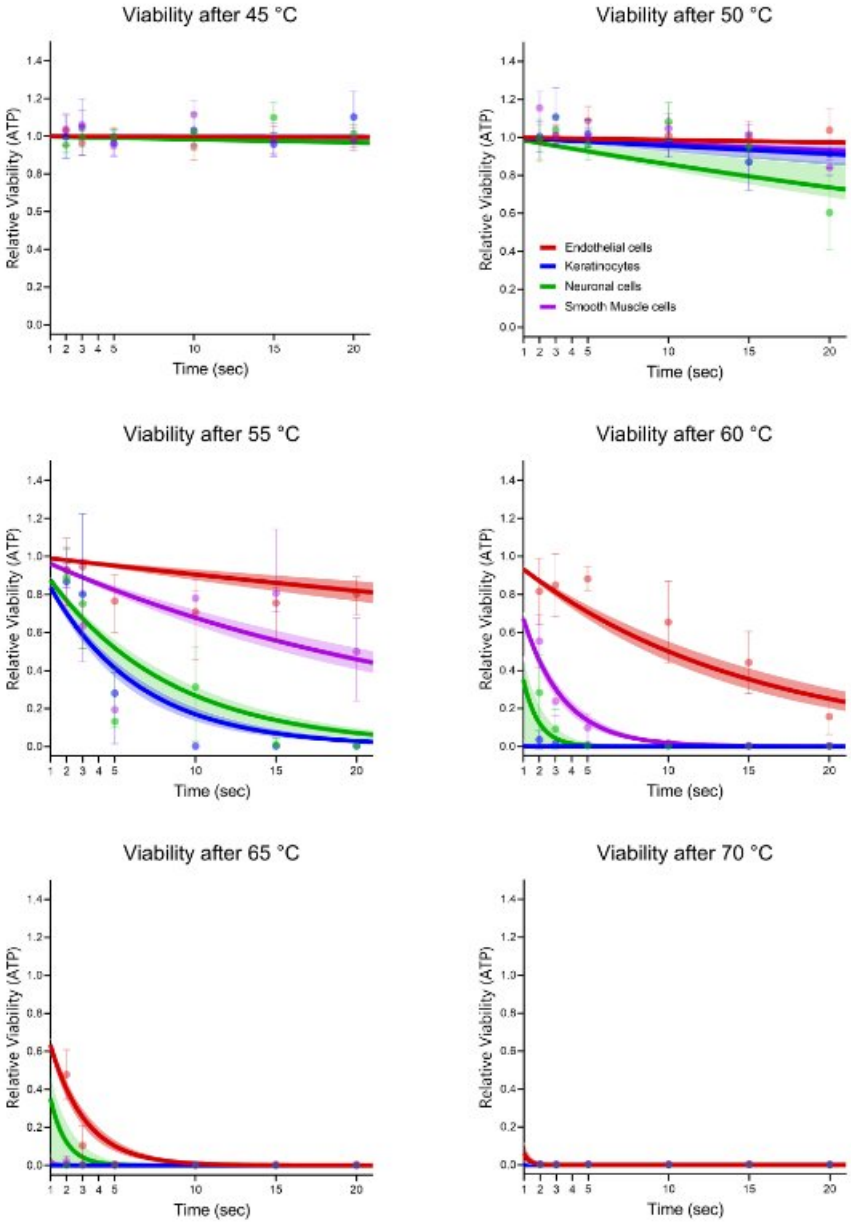

Fig 6. Cell survival after hyperthermia of endothelial cells, smooth muscle cells, keratinocytes, and neuronal cells. Fits for survival data is also shown through the line plots. Survival fractions are relative to the ATP levels at exposure to 37°C Dots indicates the median of the cell data (n=9), with error bars indicating the full range. Line plots indicate the Arrhenius damage model for thermal damage, error bands show the 95% CI. bars indicate the standard deviation of the median.

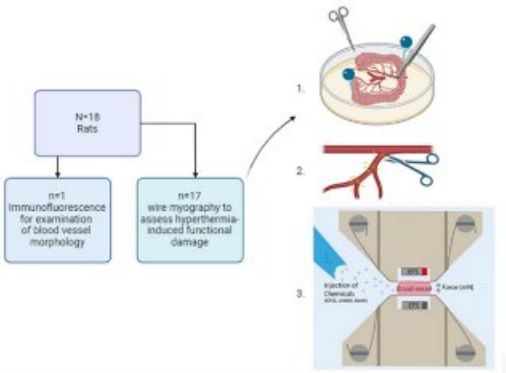

Fig. 7 Diagram of the distribution of rats and illustration of the technical procedure for the wire-myograph experiment

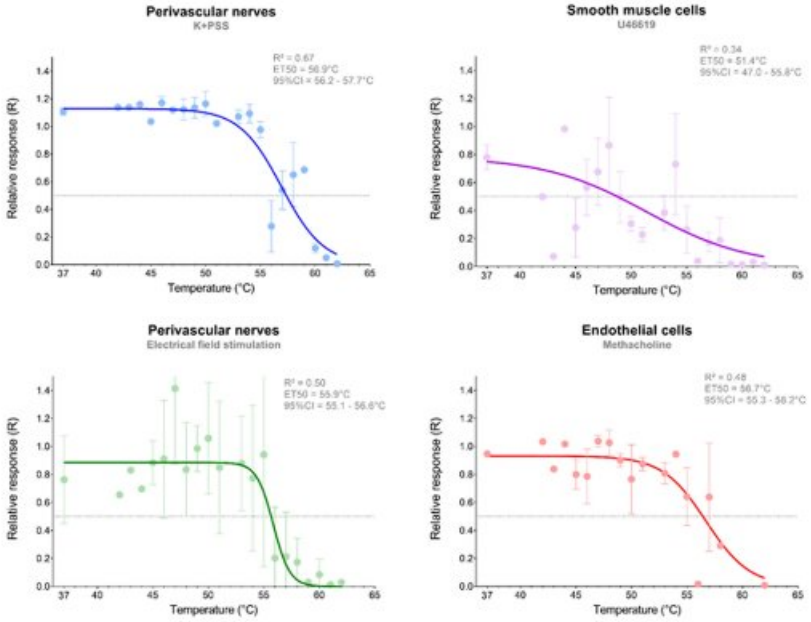

Fig. 8 Impaired functionality of rat mesenteric arteries after hyperthermia. The figure displays the least squares regression fit (line), with each point representing the mean ± SEM of the ratio before and after heating. Control groups were subjected to 37°C conditions. The graphs show a grey-dotted line at 0.5 at which the intersection represents the ET50: The temperature at which vessel function is decreased by 50%. The goodness of fit (R2) and the 95% confidence intervals for the ET50 are indicated for each stimulus. The graphs represent distinct stimuli: KPSS, U46619, methacholine, and electrical field stimulation, each chosen to target specific cell types within the artery

EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 4833

Biochemical Impacts of Applied Ultraviolet (UV) Filters on Coral Reef Ecosystems – systematic review

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Introduction & Objectives:

Coral reefs, vital to marine biodiversity, are increasingly threatened by various anthropogenic factors, including the presence of ultraviolet (UV) filters in sunscreen products that are washed into water. This review aims to synthesize the current scientific understanding of the biochemical impacts of UV filters on coral reef ecosystems, focusing on the mechanisms through which these chemicals affect coral health and vitality.

Materials & Methods:

The authors conducted a comprehensive literature review in April 2024 using PubMed database, with search terms related to “UV filters,” “coral reefs,” and “biochemical effects.” Out of 34 retrieved articles, 21 were selected based on the criteria that they specifically addressed biochemical pathways and mechanisms disrupted by UV filters in coral species.

Results:

The review highlights that UV filters, particularly oxybenzone and octinoxate, are found in concentrations sufficient to cause adverse effects in corals, such as bleaching, DNA damage, and endocrine disruption. Studies demonstrate that these filters induce oxidative stress and can lead to the activation of viral lytic cycles in symbiotic microalgae. The literature also suggests a significant role of UV filters in altering juvenile coral development and calcification processes.

Conclusion:

The biochemical impact of UV filters on coral reefs is profound and multifaceted, affecting various levels of biological organization from molecular to ecological scales. This review underscores the urgent need for the development of coral-safe UV filters and the implementation of more rigorous environmental regulations to mitigate the ongoing threat to coral ecosystems. Further research is recommended to explore alternative UV filtering compounds and their long-term impacts on coral health.

EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
EUROPEAN ACADEMY OF DERMATOLOGY & VENEREOLOGY

Abstract N°: 6238

Fractional CO_2 laser-assisted photodynamic therapy for field cancerization treatment: an intraindividual comparison

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Introduction & Objectives:

Actinic keratosis is a commonly encountered condition in our clinics, and we are increasingly seeing patients with diffuse actinic keratoses of the scalp on a background of severe chronic photodamage known as "field cancerization." This clinical situation can be considered a "ticking time bomb" for the development of invasive squamous cell carcinomas, making it crucial to properly treat the patient and provide adequate follow-up.

Therapeutic alternatives for these patients are divided into topical therapies (5-fluorouracil, imiquimod, and tirbanibulin) and physical therapies (photodynamic therapy, or PDT).

Materials & Methods:

To enhance the effectiveness of PDT, our group thought of preparing the treatment area with fractional CO_2 laser for two main reasons: 1) recent scientific findings indicating that the laser induces fibroblasts to produce IGF1 (a protective factor against UV rays), and 2) the drug-delivery effect, which allows better permeation of the photosensitizer (MAL or ALA) into the tissue.

To evaluate the efficacy of this combination compared to PDT alone, 18 patients with diffuse actinic keratoses of the scalp on a field of cancerization were recruited, and AKASI scores of the two hemispheres of the scalp were calculated. Fractional CO_2 laser (20mJ pulse energy with 1000 µm spacing) was then applied only to the hemisphere with the higher AKASI score. Following this, MAL was applied to the entire scalp and kept under occlusion for three hours.

A photo-diagnosis was conducted using a Wood's lamp to observe the difference in photosensitizer uptake between the two hemispheres, followed by irradiation with a red LED light (wavelength 630 nm) at a fluence of 37 J/cm^2 for 8 minutes per hemisphere, with a pain VAS assessment during therapy. The patients were then followed up at three months for post-therapy clearance of actinic keratoses and at a further nine months to monitor for any recurrences.

Results:

The results obtained were excellent both in terms of short-term clearance, but even more satisfying was the long-term outcome (one-year follow-up) in reducing the probability of recurrences on the side treated with the laser, demonstrating its protective effect on keratinocytes.

Conclusion:

The final goal of the study is to demonstrate the ability to improve the effectiveness and duration (by reducing the recurrence rate) of an already excellent therapy like PDT through the use of lasers in this subset of patients.

EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
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Abstract N°: 6654

A comparative study of the photoprotective potential of ectoin, ascorbic acid and tocopherol against UVA damage in human primary skin cells

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Introduction & Objectives:

The UVA component of sunlight is oxidative in nature and generates both reactive oxygen species (ROS) and potentially harmful cytosolic 'labile iron' (LI). The harmful consequence of UVA-induced LI release is the formation of highly reactive ROS via Fenton chemistry which can overwhelm the antioxidant capacity of the skin cells leading to irreversible damage to cell components, notably to lipids in the form of lipid peroxidation. The latter is considered as the prominent marker of UVA-induced photo-oxidative damage in the skin. In this study the photoprotective potential of membrane antioxidant tocopherol and membrane stabiliser ectoin was compared to antioxidant ascorbic acid (AA) either as a stand-alone photo-protectant or in combination in UVA-irradiated primary human skin fibroblasts.

Materials & Methods:

Cultured human primary skin fibroblasts were treated (or not) with compounds at a series of concentrations up to 100 µM for 24 hours. MTT cytotoxocity assay was performed 24 hours after irradiation (or not) of cells with UVA broad spectrum Sellas lamp (340-400 nm, Germany) up to a highest dose of 500 kJ/m2. The cytosolic LI was measured from 1 to 24 hours after UVA irradiation (or not) with a highly sensitive iron sensor recently developed by us (Hider et al, 2023, Molecules 28(18):6467) .

Results:

The MTT cytotoxicity assay revealed that pre-treatment of cells with 40 uM of either compound (AA, tocopherol or ectoin) significantly increased the cell viability of UVA-irradiated cells from ca 50% (at 500 kJ/m2) to 75-80%, respectively. The cytosolic LI level in UVA-irradiated cells was also increased up 3-fold when compared to unirradiated control fibroblasts, when measured with our customised highly specific LI sensor. However, while prior to UVA irradiation, pre-treatment of skin cells with either compound was not able to modulate the basal level of cytosolic LI, after UVA irradiation, the compound treatments were able to significantly decrease the potentially damaging level of UVA-induced cytosolic LI release to that of unirradiated control levels, in line with their observed photoprotective effect. Further combination treatment of cells with compounds at equimolar concentration of 40 uM as AA:tocopherol, AA:ectoin and tocopherol:ectoin did not provide additional photoprotective effect to UVA-irradiated skin cells.

Conclusion:

Our results suggest that all these compounds as stand-alone antioxidants possess a promising potential for protecting the skin cells against the harmful impact of UVA radiation by mitigating the UVA-induced increase in intracellular level of LI in skin cells and thereby preventing the radiation-mediated oxidative damage. This can be attributed to their strong ROS neutralising properties.

EADV CONGRESS
AMSTERDAM 25-28 SEPTEMBER 2024
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Abstract N°: 6721

Efficacy of Phototherapy in Chronic Pruritus: A Systematic Review and Meta-Analysis

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Introduction & Objectives:

For over fifty years, phototherapy has been used to manage pruritus in dermatologic conditions. However, the underlying mechanisms and the efficacy of phototherapy in treating pruritus, both in dermatologic and systemic conditions, remain unclear, with studies showing varied outcomes on its anti-pruritic effects. This systematic review evaluated the effectiveness of phototherapy in chronic pruritus (CP) without underlying dermatoses, including generalized pruritus of unknown origin (GPUO) and uremic pruritus (UP), cholestasis-associated pruritus (CaP), as well as CP secondary to chronic scratch lesions, including prurigo nodularis (PN).

Materials & Methods:

A systematic search of EMBASE, SCOPUS, and PubMed was performed using controlled search terms from inception to August 2023. Primary research articles (e.g. randomized and quasi-experimental designs, cohort studies, case series, conference abstracts) and studies utilizing various forms of phototherapy, with documented quantitative or qualitative pruritus measures, met the inclusion criteria. A Hedges' g random-effects model was utilized for the meta-analysis.

Results:

2,784 articles were screened, and 30 studies met the inclusion criteria. Studies examined UP (n=18), GPUO (n=4), CaP (n=2), and PN (n=8). Three studies using narrowband ultraviolet B (NBUVB) phototherapy and visual analogue scale (VAS) or 5-D itch scale were eligible for meta-analysis. The results demonstrated a high I2 value (99.42%) and a significant Cochran's Q statistic ($p < 0.0001$). Comparing Narrowband Ultraviolet B (NBUVB) phototherapy to control groups treated with either antihistamine and corticosteroids or pregabalin revealed a weighted mean Hedges' g effect size of 1.14 with a 95% confidence interval ranging from -0.63 to 2.91.

Conclusion:

Our findings demonstrated a large effect size of NBUVB when compared against control groups. However, due to the high heterogeneity among studies, these findings should be interpreted with caution. Further experimental studies are required to draw conclusions regarding the efficacy of phototherapy modalities for chronic pruritus.

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Abstract N°: 7120

Sun protection factors for different biological effects produced by different types of cloud cover and shading of natural and artificial structures

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[1]University of Málaga, Medicine and Dermatology. Faculty of Medicine, MALAGA

Introduction & Objectives:

All information on the potential damage of UV radiation through clouds, as well as different natural and artificial shadow is based on the erythema-generating action. However, other potential biological effects of solar UV radiation and its action potential are not yet known, specially effects depending on UVA radiation as well as high energy visible light. The objective of the present work was to quantitatively and qualitatively analyse the transmittance spectra of solar radiation through different types and thicknesses of cloud cover as well as different shadow structures and its action potential for different biological effects on the skin.

Materials & Methods:

Solar irradiance was analysed under clear sky conditions and after the presence of clouds of different types and thickness and under different natural (trees) and artificial structures (shadows of buildings, vehicles and awnings). A CCD spectroradiometer collected irradiance data between 290-750nm at intervals of seconds. Transmittance spectra were calculated for the different UV and visible spectral bands, and sun protection factors were calculated for different skin biological effects dependent mainly on UVB (erythema), UVA (permanent pigmentation) or high-energy UVA-visible (immediate pigmentation, generation of oxidative stress or immunosuppression).

Results:

It was observed that cloud thickness qualitatively affected the transmittance of UV radiation. The type (altocumulus, stratus and stratocumulus) and thickness of cloud cover resulted in lower spectral transmittance although equating to solar protection factors, under maximum cloud cover no protection factors are exceeded for any of the UV and visible dependent biological effects.** Natural structures of different densities (higher leaf coverage) such as oleanders, palms, pines and eucalyptus trees were able to protect more than the rest with an SPF from 3.89 to 8.37 and UVAPF between 4.67 and 11. Sun protection factors against UV-visible dependent effects such as immediate pigmentation, oxidative stress or immunosuppression in humans determined maximum protection factors of above 10. Architectural structures, as well as facades, columns and cars offered solar protection factors 33.32 and 7.14, values very similar to those for UVA protection, reaching maximum values above 11 in the case of protection factors against oxidative stress or immunosuppression in humans. Similar values were obtained for awning coverings.

Conclusion:

Clouds, even under high level of sky coverture presented high UV and high energy visible light transmittance. In case of shadow from natural and artificial structures, the protection factors is also limited. Therefore, in conditions of high sun exposure, even under natural or artificial structures, body photoprotection should be complemented by other physical measures (use of textiles, umbrellas, sunglasses) as well as the use of topical photoprotectors for uncovered areas of the skin.

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Abstract N°: 7478

Impact of LED Therapy on Dermatological Conditions: A 24-Month Prospective Study

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Introduction & Objectives: Light Emitting Diode (LED) technology uses specific light sequences to modulate cellular activity. As a non-invasive, painless modality with non-ionizing wavelengths, LED offers significant safety, is cost-effective, and requires minimal space. This study evaluates the efficacy of LED therapy for various dermatological indications and explores potential side effects in 201 treated cases.

Materials & Methods: This prospective observational study spanned two years, from January 2022 to December 2023. It included all patients who underwent LED treatment sessions in the dermatology department. The device used was set 10 cm from the skin, with treatment sessions ranging from 10 to 15 minutes according to the chosen protocol. Outcomes were assessed through comparative analysis of pre- and post-treatment images, supplemented by patient record reviews.

Results: Over the study period, 2035 LED sessions were performed for 201 patients, with an average of 10 sessions per patient. The primary indications for LED therapy included wound healing (101 patients treated for ulcers, post-surgical scars, traumatic scars, lichen, and pemphigus), alopecia (43 patients, mainly for androgenic alopecia), burns (20 patients), acne (14 patients), rosacea (5 patients), and vitiligo (2 patients). Clinical evaluations indicated substantial benefits, notably in reducing pain, controlling bleeding, and enhancing healing quality. Most patients showed excellent healing outcomes, ranging from complete recovery to significant improvement. Alopecia patients generally demonstrated improvement or stabilization. In vitiligo, non-segmental types showed signs of repigmentation, while segmental types showed no improvement. Acne results varied with severity. No serious adverse effects were reported.

Conclusion: The significant enrolment of patients for LED sessions reflects growing interest in this non-invasive therapeutic modality within dermatology. The clinical efficacy of LED across various conditions, especially in improving ulcer healing, highlights its potential as a complementary tool for accelerating recovery processes. However, the absence of a control group limits the ability to compare LED efficacy against other treatments directly. Future controlled studies are recommended to confirm these results and optimize treatment protocols.

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Usefulness of a digital medical device to optimise the effectiveness and safety of natural daylight PDT: a clinical study in Spain

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Introduction & Objectives:

Natural Daylight Photodynamic Therapy (NDL-PDT) is an efficacious treatment of actinic keratosis (AK). However, the use of daylight introduces uncontrolled variability that may influence the effectiveness, such as time of year, cloudiness, sunscreen application and patient behaviour . An innovative satellite-based solution (SmartPDT) is the first scientifically validated digital medical device (CE-marked Class 1) solving this . The dermatologist can accurately plan and then monitor in real-time the effective (PpIX-effective) and safe (erythemal) solar radiation doses.

Materials & Methods:

An observational, multicentre, prospective study of clinical practice took place in Spain from June 2022 to October 2023. Clinical teams used the web-portal for monitoring either a hospital-based NDL-PDT or a home-based NDL-PDT performed by the patient using its related mobile app. Follow-up clinical evaluation was performed at 3 months.

Results:

A total of 37 patients were included, 5 females and 32 males, with ages ranging from 51 to 87 years old. All NDL-PDT sessions were performed according to the current clinically-accepted therapy protocol [3], so exposing patients for exactly 2 hours to sunlight independently from weather conditions. AK severity (AKASI score) was assessed before and 3 months after treatment, considering scalp, forehead, left face and right face separately.

For all body sites considered, PpIX-effective solar doses ranged from 2.98 Jeff/cm2 to 23.8 Jeff/cm2, while erythemal doses ranged from 1.9 Jeff/m2 to 61.84 Jeff/m2. Air temperature ranged from 7.3 ˚C to 39.58 ˚C. A preliminary analysis on the correlation between treatment outcome (quantified by the AKASI decrease) and monitored environmental variables was conducted and we will present its results.

Conclusion:

This study demonstrates that a satellite-based digital system can help clinicians to optimise the overall management and effectiveness of NDL-PDT, planning and monitoring the environmental variables affecting its clinical outcomes and safety. This can help to provide a more effective and comfortable treatment with higher therapy adherence.