Conclusions

The results of this study demonstrate that a single application of the photostable UVA/UVB broad spectrum SPF 55 sunscreen provides protection for multiple cellular damage markers against a harsh dose of UV insult (55 MED).

The photo-protective effects include: preventing keratinocytes from UV-induced cell death, shielding DNA from UV-induced thymine dimerization, reducing p53 induction due to reduced tumor risk, defending Langerhan's cells against UV-induced depletion, and inhibiting the UV-induced formation of neutrophil collagenase (MMP-9).

These results indicate that the photostable SPF 55 sunscreen can protect skin against collagen breakdown, premature aging, immune suppression, cell death, DNA damage, tumorigenesis and skin cancer associated with UV exposure.

References

6. Data on file, Neutrogena Corp.
Introduction

UV-induced skin damage becomes apparent only when there are visually evident signs on the skin, which can range from acute (erythema/burn) to chronic (wrinkling and sagging). However, underlying UV-induced cellular damage in the epidermis and dermis that precedes these is invisible. Exposure to UV at doses readily present in the environment (1 to 3 Minimal Erythema Doses, MED) inflicts detectable and measurable damage in these tissues. Recently, a patented photostable sunscreen system1 that combines avobenzone, oxybenzone and the photostabilizer diethylhexyl 2,6-naphthalate (DEHN) to provide exceptional absorptance throughout the UVA and UVB spectrum with maximum photostability has been introduced into several different forms of sun protection products from lotions to gels and sprays, and also into daily moisturizers.2-4

We have previously shown that an SPF 30 sunscreen moisturizer containing the patented photostable sunscreen system effectively prevented the formation of key cellular damage markers in the skin after irradiation with 30 MED.2 We now report the study findings of an SPF 55 sunscreen containing the patented photostable sunscreen system. This SPF 55 sunscreen has been demonstrated to block over 95% of the biologically damaging UVA rays (320–400 nm) and over 98% of biologically damaging UVB rays (290–320 nm).2-4 Its photo-protective effects against multiple pathways of UV-induced molecular damage in keratinocytes and Langerhans cells have been previously reported.2-4

Materials & Methods

Study Materials

A broad-spectrum SPF 55 sunscreen containing the patented photostable sunscreen system with the sunscreen actives avobenzone, homosalate, octisalate, octocrylene, and oxybenzone.

Study Population

Twelve healthy participants (3 male, 9 female) of Fitzpatrick skin types I – III, ages 33 to 58 years (mean 44.2). The minimum erythema dose (MED) of each subject was determined prior to product testing.

Study Method

Four test sites on the lower back of the subjects were marked and randomized to receive one of the following:

- Untreated/0 MED Unirradiated
- Untreated/1 MED Irradiated
- Untreated/3 MED Irradiated
- Sunscreen Treated/55 MED Irradiated: SPF 55 Sunscreen was applied at 2 mg/cm² 30 minutes before exposure to 55 MED.

Twenty four hours after exposure, 2 mm punch biopsy samples were taken by a board certified dermatologist using the standard procedure, and fixed in 10% formalin. The fixed samples were processed and stained for selected markers, and assessed by a board certified pathologist.

Note: In all figures, the results shown are the averages of 12 subjects; 4 – 6 fields per subject were processed and stained for selected markers, and assessed by a board certified pathologist.

Study findings:

Four test sites on the lower back of the subjects were marked and randomized to receive one of the following:

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