



# **High SPF Sunscreens: a Dermatologist's Viewpoint**

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# **Theoretical Effect of SPF on Exposure Reduction**

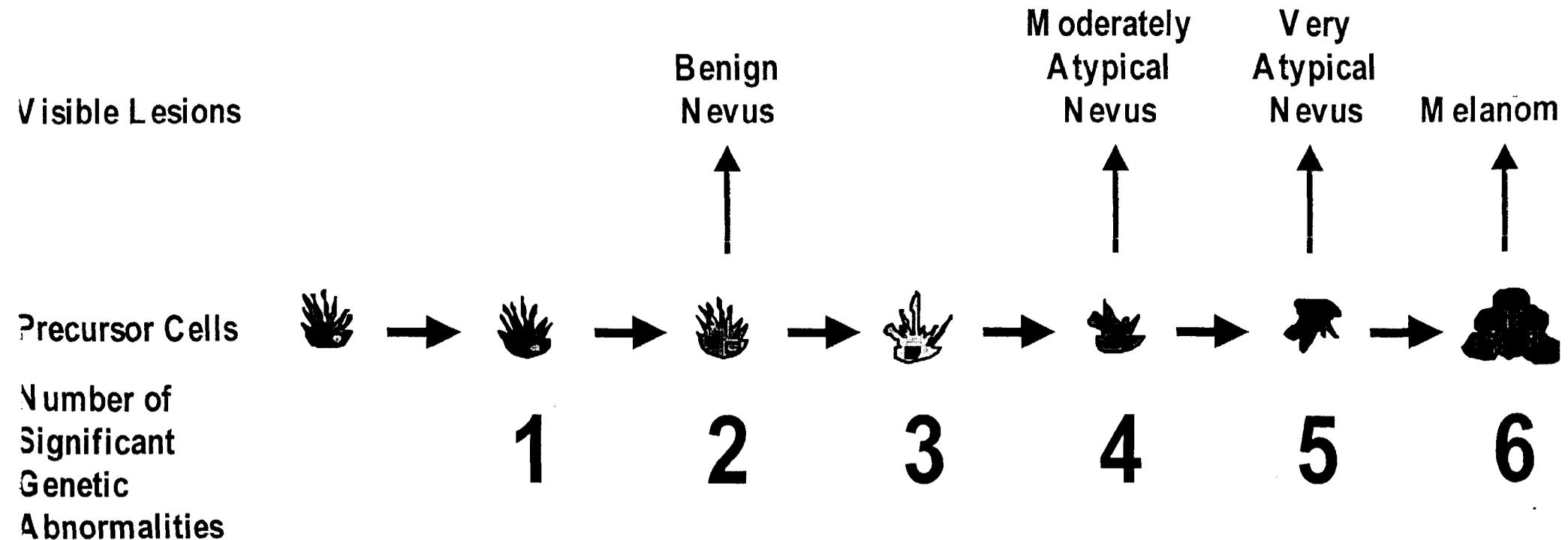
- **Lifetime UV exposure reduction in the general population can be accomplished by low SPF (4-15) preparations**
- **Low SPF preparations are inadequate for high risk individuals**

# High Risk Individuals

- **Individuals with actinic keratoses or skin cancer**
- **Individuals at high risk for melanoma**
- **Individuals with outdoor occupations**
- **Individuals who desire minimal photoaging**
- **Individuals with photosensitivities**

# Melanocytic Progression

- Genetic abnormalities are UV-induced
- Complete protection from UV halts progression



# High Risk vs. Low Risk for Skin Cancer

## High Risk

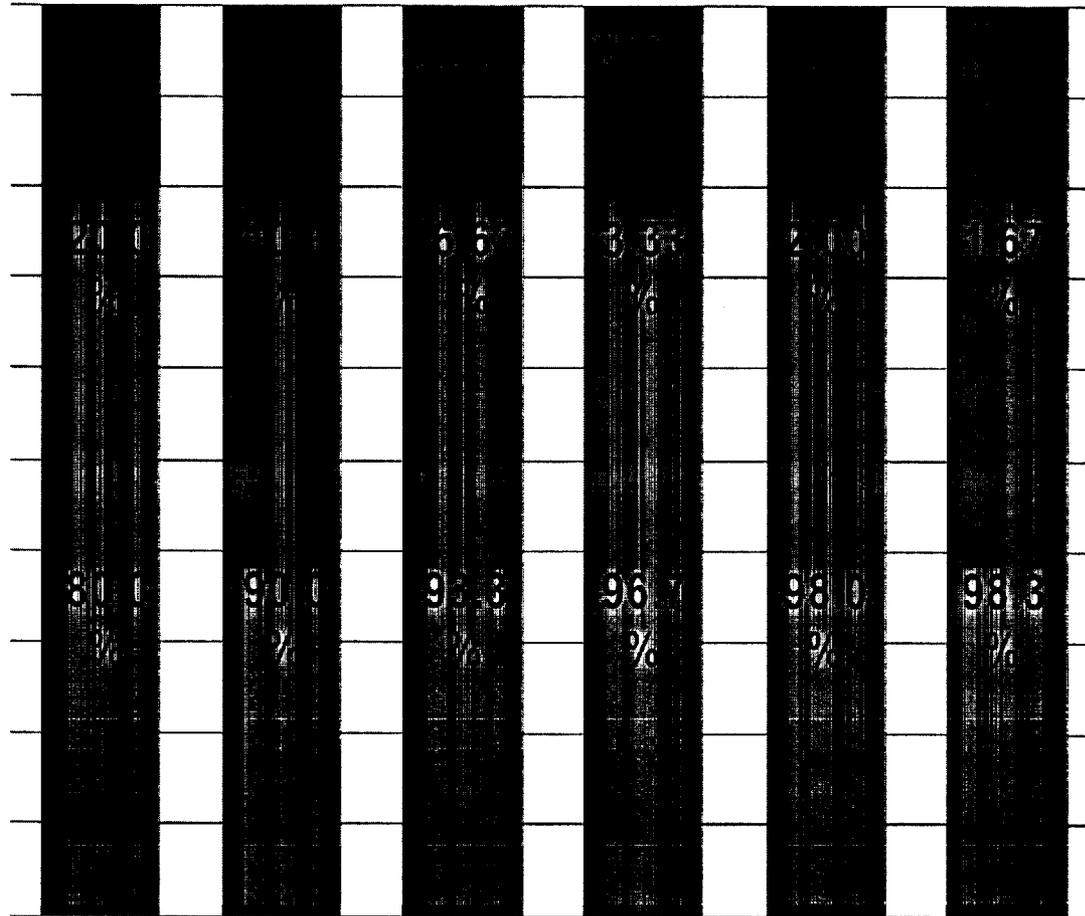
- ◆ Many genetic abnormalities
- ◆ One UV “hit” may generate a tumor
- ◆ Intolerant to UV damage
- ◆ >SPF 30 for maximum effect

## Low Risk

- ◆ No or few genetic abnormalities
- ◆ Many “hits” to generate a tumor
- ◆ Tolerant to UV damage
- ◆ SPF 30 adequate for lifetime cancer prevention?

# Theoretical Effect of SPF on Incident UV

Incident UV  
Blocked UV



SPF

# Two-Year SPF Comparison<sup>1</sup>

SPF	Cumulative MEDs (2 y r)	Improvement Over Preceding SPF	Absolute Improvement	Apparent Improvement Over Previous SPF
0	1453			
5	291	80.0%	80.0%	
10	145	50.0%	90.0%	10.0%
15	97	33.3%	93.3%	3.3%
30	48	50.0%	96.7%	3.3%
50	29	40.0%	98.0%	1.3%
60	24	16.7%	98.3%	0.3%

<sup>1</sup>Daily Ideal Use; Fort Worth, TX., 10% Total UV

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# Photodamage Prevention

- More difficult than sunburn prevention
- UVA is more important
- 1/6 MED of UVB upregulates enzyme systems involved<sup>1</sup>

<sup>1</sup>Fisher GJ, Datta SC, Talwar HS, *et al.* Molecular basis of sun-induced premature skin ageing and retinoid antagonism. *Nature*. 1996;379:335-339.

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# The Elusive Vampire Block: The Holy Grail of Sunscreens

## PREVENTION OF POLYMORPHOUS LIGHT ERUPTION BY A NEW BROADSPECTRUM SUNSCREEN : NEED FOR A HIGH UVA PROTECTING FACTOR

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### INTRODUCTION

It plays an essential role in triggering sunburn eruptions, even if these conditions are triggered by irradiations spanning the whole spectrum of sunlight. Consequently, researching the best UVA blocking system seemed essential for protecting sensitive subjects, and particularly those who develop polymorphous light eruption (PLE) from their first exposures to sunlight.

Here, Mexoryl XL was added to the existing high performance combination of UVA filters Mexoryl S<sup>+</sup> and Avobenzone (Parsol 1789)(1), which yet unequaled level of protection against UVA to be obtained (SPF(UVA) = 23).

The efficacy of this new formulation in preventing the occurrence of PLE was studied following exposure of one half of the body to the sun in comparison with a commercial formulation having a similar solar protection factor (SPF > 30), but with a lower UVA filtering power.

### MATERIAL AND METHODS

#### 1.1

**1.1.A** UVA Filter: Octocrylene  
**1.1.B** UVA Filters: Tetraethylsilylethyl dimethylsulfoniol succinate (Mexoryl S<sup>+</sup>),  
 Dimethylamyl triazone (Mexoryl XL),  
 Avobenzone (Parsol 1789)  
**1.1.C** SO<sub>2</sub>

**1.2.B** UVB Filters: Homosalyl, methylsalicylate,  
 Octyl methoxycinnamate,  
 4-Methylbenzylidene camphor  
**1.2.C** UVA Filter: Avobenzone  
**1.2.D** SO<sub>2</sub>

**1.3** Determined according to the FDA method (2).  
 Determined according to the persistent pigment darkening (PPD) method (3).

**1.4** Selection with a predisposition for PLE, with no circulating anti-nuclear antibodies, categorized as phototype II or III, aged 22 to 51 years. The 35 were especially sensitive to PLE and had had no exposure to sun during at least 3 months.

### 1.5 APPLICATION OF THE PRODUCTS

The products were applied on one half of the body by the subjects, before and during each new exposure. The allocation of the product to a given half of the body was randomized.

### 1.6 EXPERIMENTAL DESIGN

The volunteers were exposed to the sunlight during 6 days, once in the morning and once in the afternoon, at increased doses of UV. The UVA and total UV erythematosus doses were recorded with a PMA radiometer from Solar Light.

Days	D1	D2	D3	D4	D5	D6	Total
UVA Doses (J/cm <sup>2</sup> )	41	82	123	164	205	246	861
MED*	1 MED	2 MED	3 MED	4 MED	5 MED	6 MED	21 MED
Duration	1 hour	6 hours					

\* Minimal Erythema Dose

The UVA doses to be given were selected based on previous studies in order to be realistic.

The doses of UV received did not cause erythema due to the products very high protecting power (SPF).

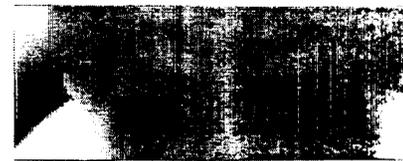
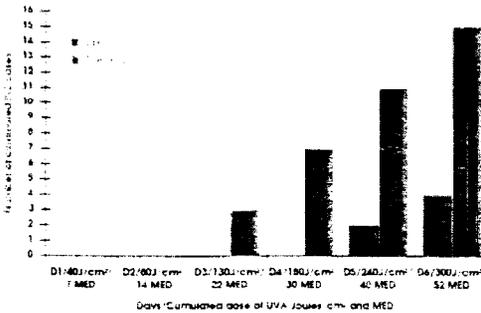
### 1.7 CLINICAL EVALUATIONS

The assessments were made each evening by the dermatologist who was blinded to the nature and allocation of the products in each volunteer. The signs characteristic of PLE were scored: reticular erythema, papules, pruritus. The test area was the upper part of the chest (constant area of occurrence of PLE), the other areas being used to confirm the first result.

### 2 RESULTS

With Cream B, 15 subjects out of 35 developed PLE between Day 3 and Day 6. Conversely, only 4 of these subjects developed PLE with Cream A. Moreover, the occurrence of PLE was delayed compared to the hot chest treated with Cream B. Cream B was not efficacious enough to prevent PLE (94% of occurrences). On the other hand, Cream A markedly prevented PLE (78% of cases), or delayed or decreased its severity (25% of cases).

Total number of PLE cases



Examples of PLE on hot chest

### 3 CONCLUSION

The present study confirmed the role of UVA in triggering PLE as well as the need for highly protective products covering the whole spectrum and UVA.

Two products with similar SPFs were not equivalent in terms of prevention of PLE. The product with a high protection factor against UVA, as determined by the persistent pigment darkening method (PPD), was markedly more efficacious than the product with a lower protection factor in this domain of the UV spectrum. This underlines the spectral advantage (and superiority) of a product with a higher protection power in the UVA domain. The level of protection evaluated according to the PPD method seems to be a more reliable efficacy in the prevention of PLE.

### 4 REFERENCES

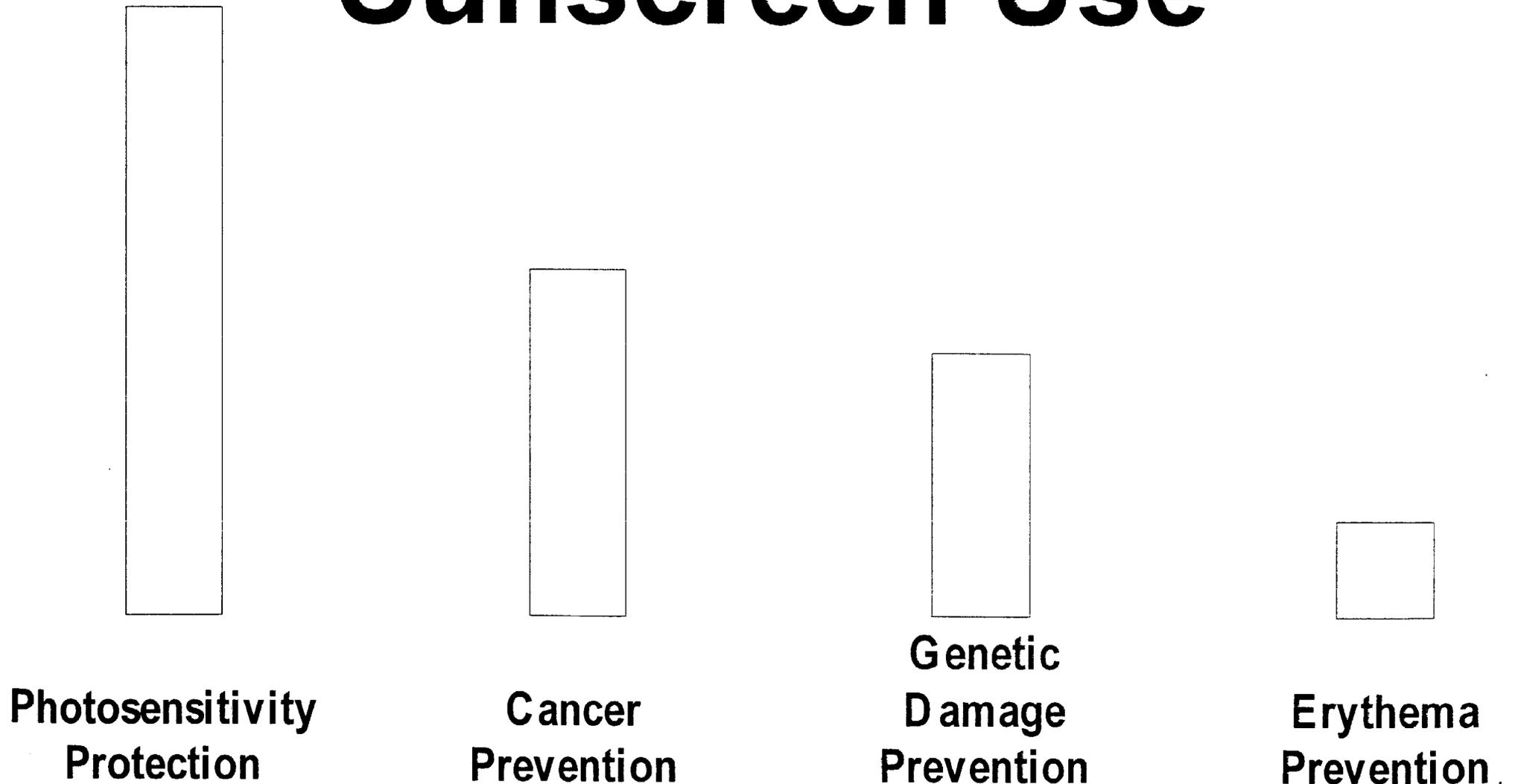
- Moyat D, Binet O, Richard A, Rougier A, Hourseau C. Development of a new broad spectrum sunscreen with Mexoryl XL. J Cosmet Sci 2004; 55(1): 1-10.
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# Important Goals for Sunscreen Use



**Photosensitivity  
Protection**

**Cancer  
Prevention**

**Genetic  
Damage  
Prevention**

**Erythema  
Prevention**