Sunscreen Sensitization: a 5-year Study

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The purpose of this study was to evaluate the prevalence of sunscreen contact allergy and/or contact photoallergy in 370 patients with suspected photodermatitis. Patch and photopatch tests were performed using the French Society of Photodermatology (SFPD) standard series. A total of 57 cases of contact allergy and/or photocontact allergy to sunscreens were diagnosed (15.4%). Amongst these, 27 reactions were related to oxybenzone and 14 to isopropyl dibenzoylmethane. These results, obtained from January 1990 to December 1994, confirm that, given the high frequency of photodermatitis cases, a large part of the battery of photopatch tests should be dedicated to sunblocks. Key words: photoallergy; photopatch tests; oxybenzone; dibenzoylmethane.

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For several years we have observed a marked increase in the use of sunscreen agents, particularly because they have been incorporated in cosmetic products to prevent photoageing and the carcinogenic effects of solar radiation. As a result, publications about allergy and/or photoallergy to UV filters are now more frequent than in the past (1, 2). The purpose of this study was to evaluate the prevalence of sunscreen contact allergy and/or contact photoallergy in 370 patients with suspected photodermatitis.

Table I. Battery for patch and photopatch tests: January 1990 to December 1992

Sunscreen agents
- P-aminobenzoic acid (PABA) 5% Pet.
- Escalol 507 (octyldimethyl PABA) 2% Pet.
- Parsol MCX (2-ethylhexyl-p-methoxy cinnamate) 2% Pet.
- Isoamyl p-Methoxy cinnamate 2% Pet.
- Eusolex 6300 (3-(4-methyl benzylidene) camphor) 2% Pet.
- Eusolex 8020 (isopropyl dibenzoylmethane) 2% Pet.
- Parsol 1789 (butyl methoxy dibenzoylmethane) 2% Pet.
- Eusolex 4360 (2-hydroxy-4-methoxy benzophenone) 2% Pet.
- Benzophenone 4 2% Pet.

Other photosensitizing substances
- Chlortetracycline 3% Pet.
- Hexachlorophene 1% Pet.
- Bithionol 1% Pet.
- Chlorpromazine 0.1% Pet.
- Promethazine 1% Pet.
- Musk ambrette 5% Pet.
- Sulphanilamide 5% Pet.

* Tested since July 1991.

PATIENTS AND METHODS

From January 1990 to December 1994, 370 patients (130 men and 240 women; mean age 44 years) with suspected photodermatitis were patch-tested and photopatch-tested using the French Society of Photodermatology standard series (TROLAB, Hermal D21462 Reinkeb RFA) in triplicate (Tables I and II). The photobiological testing was performed with a polychromatic irradiation (1000 W Xenon light, Dermolm III K-Müller, Moosinning Germany) filtered with a Schott WG 305 filter, and a high-pressure metal halide UVA lamp (2000 W, TROLAB).

Table II. French Society of Photodermatology standard series: used January 1993 to December 1994

Antiseptics
- Triclosan (Irgasan DP 300) 2% Pet.
- Tetrachlorosalicylanilide 0.1% Pet.
- Tribromosalicylanilide 1% Pet.
- Hexachlorophène 1% Pet.
- Bithionol 1% Pet.
- Fentichlor 1% Pet.
- Chlorhexidine digluconate 0.5% water

Cosmetics
- Fragrance mix 8% Pet. (cinnamic alcohol, cinnamic aldehyde, hydroxycitronellal, eugenol, isoeugenol, geraniol, oak moss absolute, amylicaminaldehyde)
- Musk ambrette 5% Pet.
- 6-Methyl Coumarine 1% Pet.
- Formaldehyde 1% water
- Peru balsam

Vegetal products
- Wood tar mix 12% Pet. (pine, beech, juniper, birch)
- Frullania 1% Pet.
- Oak moss absolute 1% Pet. (atranorin, euricnic acid, usnic acid)
- Lactone mix 0.1% Pet.

Sunscreen agentsa
- P-aminobenzoic acid (PABA) 10% Pet.
- Escalol 507 (octyldimethyl PABA) 10% Pet.
- Parsol MCX (2-ethylhexyl para-methoxy cinnamate) 10% Pet.
- Isoamyl P methoxy cinnamate 10% Pet.
- Eusolex 6300 (3-(4-methyl benzylidene) camphor) 10% Pet.
- Eusolex 8020 (isopropylidibenzoylmethane) 10% Pet.
- Parsol 1789 (butylmethoxy dibenzoylmethane) 10% Pet.
- Eusolex 4360 (2-hydroxy-4-methoxy benzophenone) 10% Pet.
- Mexenone (2-hydroxy-methoxybenzophenone) 2% Pet.
- Benzophenone 4 – 10% Pet.
- Eusolex 232 (2 phenyl 5 benzimidazol sulph. acid) 10% Pet.

Miscellaneous
- Nickel sulphate 5% Pet.
- Potassium bichromate 0.5% Pet.
- Cobalt chloride 1% Pet.
- Promethazine 1% Pet.
- Chlorpromazine 0.1% Pet.
- Quinine sulphate 1% Pet.

a Concentration of 10%.b Tested since March 1993.\textsuperscript{c} Tested since August 1994.
only a few patients had photoallergy or contact allergy to PABA and Parsol MCX or Eusolex 6300 as in another recent French study (1), whereas in the USA PABA is the main photocontact allergy sensitizer (6). Our results may be explained by the low rate of use of this filter in France.

Phenothiazines, wood tar mix, fragrance mix and Peru balsam are known as photosensitizing substances (9) and are probably responsible for some unspecific phototoxic reactions, without clinical relevance, given the relatively high UVA irradiation dose we used.

Previous studies showed that fragrance, cosmetics and medications were leading sensitizers (9–11). Given the high frequency of photosensitization, a large part of the photopatch test battery should be dedicated to UV filters (12, 13).

Irradiation of UV filter patch tests is necessary considering the predominance of photoallergy compared with contact allergy induced by these molecules. An alternative is the use of physical blockers such as titanium dioxide, or camouflage creams, which have the advantage of not being sensitizing.

REFERENCES
1. Pons-Guiraud A, Jeanmougin M. Allergie et photoallergie de contact aux crèmes de photoprotection. Ann Dermatol Venereol 1993; 120: 727–731.
2. Trevisi P, Vincenzi C, Chiaregato C, Guerra L, Tosti A. Sunscreen sensitization: a three-year study. Dermatology 1994; 189: 55–57.
3. Szczurko C, Dompmartin A, Michel M, Moreau A, Leroy D. Photocontact allergy to oxybenzone: ten years of experience. Photodermatol Photoimmunol Photomed 1994; 10: 144–147.
4. English JSC, White IR, Cronin E. Sensitivity to sunscreens. Contact dermatitis 1987; 17: 159–162.
5. De Leo VA, Suarez SM, Martha J. Photoallergic contact dermatitis: Results of photopatch testing in New York, 1985 to 1990. Arch Dermatol 1992; 128: 1513–1518.
6. Droomgoole S, Maibauch H. Sunscreening agent intolerance: contact and photopatch sensitization and contact urticaria. J Am Acad Dermatol 1990; 22: 1068–1078.
7. Marguery MC, Bazex J. Photoallergic contact dermatitis due to 2-hydroxy, 4-methoxybenzophenone (oxybenzone), report of four cases. Br J Dermatol 1989; 121 Supp. 34: 59 – 60.
8. De Groot AC, Van der Walle HB, Jagtman BA, Weyland W. Contact allergy to 4- isopropyl-dibenzoylmethane and 3-(4-methylbenzylidene) camphor in the sunscreen Eusolex 8021. Contact Dermatitis 1987; 16: 249 – 254.
9. Hölze E, Neumann N, Hausen B, Przybilla B, Schauder S, Höningmann H, et al. Photopatch testing: the 5-year experience of the German, Austrian, and Swiss Photopatch Test Group. J Am Acad Dermatol 1991; 25: 59 – 68.
10. Thune P, Jansén C, Wennersten G, Rystedt I, Brodhagen H, McFadden N. The Scandinavian multicenter photopatch study 1980-1985: final report. Photodermatology 1988; 5: 261 – 269.
11. Menz J, Muller SA, Connolly SM. Photopatch testing: a six-year experience. J Am Acad Dermatol 1988; 18: 1044 – 1047.
12. Fotiades J, Soter NA, Lim HW. Results of evaluation of 203 patients for photosensitivity in a 7.3-year period. J Am Acad Dermatol 1995; 33: 597 – 602.
13. Leonard F, Kalis B, Journe F. The standard battery for photopatch test in France. Prospective study by the French Society for Photodermatology. Nouv Dermatol 1994; 13: 305 – 314.