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Anaphylaxis to oxybenzone, a frequent constituent of sunscreens

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To the Editor:

Protection from sunlight-induced adverse effects, particularly long-term effects such as induction of degenerative skin changes ("skin aging") and skin cancer, has been advocated with increasing publicity in the last few years. The most deleterious wavelengths of sunlight are contained in the range of 290 to 320 nm, referred to as UV-B light. The adverse effects of longer wavelength light, in the range of 320 to 400 nm (UV-A), has more recently been recognized and includes induction of degenerative changes, immune abnormalities, and skin cancer. The use of sunscreens is advocated as one means of protection from sunlight. It is generally thought that the benefits of sunscreen use outweigh potential risks.

Oxybenzone (2-hydroxy-4-methoxybenzophenone, benzophenone-3, methanone, diphenylketone; CAS RN chemical ID No.: 131-57-7), a constituent of sunscreens and cosmetics, is a chemical UV radiation absorber in the UV-A and UV-B range. It is the most frequent benzophenone in sunscreens¹ and is estimated to be present in 20% to 30% of commercial sunscreens. Chemical UV absorbers are also increasingly being added to cosmetics. Chemical UV absorbers, including oxybenzone, can induce adverse reactions such as skin irritation, phototoxicity, and allergic contact dermatitis that may or may not require exposure to light to develop.² We found no description of immediate hypersensitivity

reaction to oxybenzone, except for a single case of contact urticaria.³ Complication of contact urticaria in the form of anaphylaxis is rare and most frequently observed with ammonium persulfate and latex. Here we describe a case of contact-mediated anaphylaxis induced by oxybenzone.

A 22-year-old woman with a history of atopic dermatitis, mild allergic rhinoconjunctivitis in early spring, and allergic rhinoconjunctivitis when in contact with cats experienced anaphylaxis (generalized cutaneous wheal and flare reaction, dyspnea, and fainting) 10 minutes after widespread application of the sunscreen Daylong 16 (Spirig, Egerkingen, Switzerland) to normal body skin in a hotel room. A local physician diagnosed anaphylaxis, and the patient recovered after systemic administration of adrenaline, antihistamines, and corticosteroids. Some days before skin testing, she experienced contact urticaria of the face after kissing a friend who had applied the same sunscreen to the face.

Patch testing with Daylong 16 to normal skin revealed a 2-cm-diameter wheal and flare reaction within 5 minutes. Blinded patch testing with the individual constituents of Daylong 16 induced a local wheal (16 mm) and flare reaction to oxybenzone in the patient after 15 minutes, whereas nonblinded patch tests with benzophenone in 2 control subjects yielded negative results. The other constituents of Daylong 16 yielded negative test results in the patient. Results of a skin prick test with Daylong 16 and oxybenzone were positive (wheal 6 × 7 mm), and skin prick test results were positive for a mixture of pollen from early blooming trees and cat dander.

Hayden et al⁴ showed that oxybenzone can cross the epidermal barrier and that this compound and its metabolites are excreted in the urine after application of an oxybenzone-containing sunscreen to large areas of skin. Our patient applied Daylong 16 to much of her body and experienced anaphylaxis, whereas application to smaller skin surface areas elicited contact urticaria without systemic symptoms. This points to the importance of the extent of body surface area to which the antigen is applied.

This report demonstrates that oxybenzone, in addition to being absorbed through the skin, can also elicit life-threatening systemic reactions in the form of anaphylaxis in susceptible individuals. The most likely mechanism is IgE-induced anaphylaxis, although we made no attempt here to demonstrate IgE directed to oxybenzone or its metabolites. Atopy may predispose to sensitization to oxybenzone. With the increased use of oxybenzone-containing sunscreens and cosmetics, anaphylactic reactions to this compound may be observed more frequently.

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