

## Photosensitivity from Colophony in a Case of Chronic Actinic Dermatitis Associated with Contact Allergy from Colophony

Yoshinori Kuno and Mami Kato

Department of Dermatology, Nagoya City University Medical School, Mizuho-cho, Mizuho-ku, Nagoya 467-8601, Japan.

E-mail: kunoyosh@med.nagoya-cuac.jp

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Sir,

Chronic actinic dermatitis (1) is an idiopathic photosensitivity disorder. A high incidence of a previous chronic contact allergy caused by several materials, including the Compositae family, fragrances and lichens, has been reported (2). Here we report a case of chronic actinic dermatitis associated with contact allergy as well as photosensitivity from colophony. Study of the mechanisms of photosensitivity from contact allergens in such cases may indicate how repeated exposure evolves into chronic actinic dermatitis.

### CASE REPORT

A 72-year-old Japanese woman had been weeding the garden for about 30 years. For about 10 years she had been affected by chronic eczema on sun-exposed areas. The eczema was worse during spring and summer. She noticed that the eruption appeared after exposure to sunlight through a windowpane. At her first visit in June 1998, she presented with erythema and oedema on the face, nape of the neck and the V-shaped area of her upper chest. She always wore gloves while working outdoors and the dorsa of the hands were spared. Her personal and family history was unremarkable except for the eruption, and she had never used any medications habitually. The histology of the specimen from a lesion on her cheek showed a chronic eczematous reaction.

Patch tests to the European Standard and Photoallergens Series (Trolab®, Hermal, Hamburg, Germany) and to materials including pesticides were performed. These were read at day 3 and day 4 in accordance with the criteria of the International Contact Dermatitis Research Group, and the results on both days showed weakly positive reactions to colophony at concentrations down to 0.02% in white petrolatum, one-thousandth of the preparation established in the European Standard Series. More concentration of colophony added stronger reactions in patch testing. Open patch tests were positive to colophony at 0.06% but negative to 0.02% in white petrolatum. Photopatch testing was also carried out on the same series irradiated at day 2 with half the minimal erythema dose (MED) from FL20S·E-30 (Toshiba, Tokyo, Japan) as the ultraviolet B (UVB) source, or with 6J/cm<sup>2</sup> from FL32S·BL (Toshiba) as the UVA light source through a window-glass filter to cut-off wavelengths shorter than 320nm. The photopatch test results were all negative, including those to colophony, where there were no differences in the grade of reactions to colophony 20% to 0.06% in white petrolatum between patch and photopatch testing at day 3 and day 4. The MEDs judged on the uninvolved abdominal skin at 24h after irradiation with an irradiation monochromator (Jasco, Tokyo, Japan) were lower than the normal range between 290 and 350nm (3). Then the action spectrum for erythema was tested on the patient's abdomen 24h after

applying colophony 0.02% in white petrolatum or the vehicle alone. They were similar to each other at 24h after irradiation, while "MEDs" at 48h after irradiation upon applying colophony were definitely lower than those upon applying white petrolatum from 290 to 320nm, thus the patient showed photosensitivity from colophony where the action spectrum for the photosensitivity ranged from 290 to 320nm (Fig. 1). The shape of the difference action spectrum at 48h after irradiation upon applying colophony 0.02% in white petrolatum or the vehicle differed from that of the absorption spectrum of colophony 0.02% and abietic acid, one of major antigenic components of colophony (4), 0.02% in white petrolatum (Fig. 2). We also examined 4 subjects without contact allergy from colophony on their action spectrum. Two of them were affected with chronic actinic dermatitis, one with seborrheic dermatitis, and one with prurigo subacuta. Their average difference action spectrum was generally lower than the score of 0, which may indicate that colophony acted as a sunscreen in those subjects (Fig. 2).

Her eruption was remitted by avoiding sun-exposure as an inpatient for 2 weeks. Since her discharge, her skin condition has almost recovered to normal by applying sunscreens protecting from both UVB and UVA during her work outdoors.

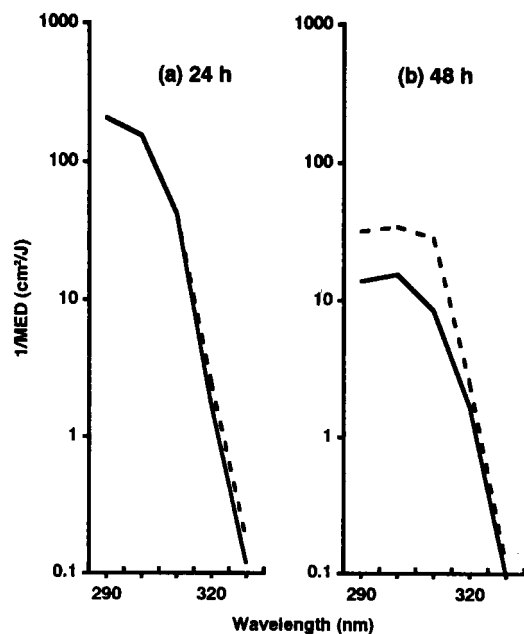


Fig. 1. Action spectrum for erythema at (a) 24 h and (b) 48 h after irradiation, where colophony 0.02% in white petrolatum (solid line) or the vehicle (broken line) had been applied 24h earlier on the patient's abdomen.

## DISCUSSION

Our patient showed a chronic eczematous reaction on the sun-exposed sites as well as some covered areas. Phototests revealed lowered MEDs to UVB and UVA on uninvolved abdominal skin without exposure to any known photosensitizers. These findings may fulfil the criteria of chronic actinic dermatitis (1, 2). She also had positive patch test results to colophony at concentrations as low as 0.02%, suggesting a contact allergy from the material. Colophony is a complex mixture obtained from pine trees (5). As our patient had several opportunities daily to come into contact with those plants, she may have been sensitized to colophony occupationally. Airborne contact dermatitis from colophony has been reported (6). However, in the present case it seems unlikely that the eruptions on her exposed sites were caused by airborne contact dermatitis because of the regression of the eruption solely by applying sunscreens during work. Moreover, it may be hard to attribute an eruption on covered sites to airborne contact dermatitis.

Because the difference in action spectrum with or without applying colophony did not occur until 48 h after irradiation in the patient, it is possible that a suberythral reaction of chronic actinic dermatitis was enhanced by a subliminal allergic reaction to colophony. Since the 4 subjects without contact allergy from colophony did not show photosensitivity from it, phototoxicity from colophony may be excluded as the mechanism behind the photosensitivity (7), and so may photoallergy because there was a discrepancy in the shape between the difference action spectrum and the absorption spectrum of colophony (7). The absorption spectrum of abietic acid also showed that the material is a non-sensitizer in colophony.

It is poorly understood how repeated exposure to some contact allergens evolves into chronic actinic dermatitis. As far as the substantial abnormal photoreaction in chronic actinic dermatitis is concerned, a delayed type hypersensitivity from some endogenous photoproducts was speculated (8), where some associated contact hypersensitivity may act by initiating and maintaining the abnormal reactions to such endogenous photoallergens (9). This hypothesis may be supported by the finding in which our patient showed additive effects for the production of erythema by subliminal contact allergy from colophony on the photosensitivity reactions of chronic actinic dermatitis. It would be interesting to investigate a different action spectrum with or without applying some contact allergens in further chronic actinic dermatitis cases associated with contact allergy as well as photosensitivity from some materials.

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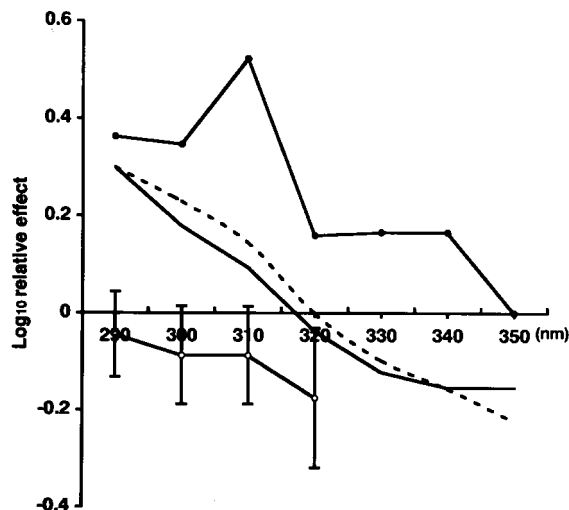


Fig. 2. The difference action spectrum at 48 h after irradiation, where colophony 0.02% in white petrolatum or the vehicle had been applied 24 h earlier in the presented case (closed circle) and that of 4 subjects without contact allergy from colophony (open circle, mean  $\pm$  SD). The solid and broken curves show the absorption spectra of colophony 0.02% and abietic acid 0.02% in white petrolatum, respectively, which were corrected to place between the action spectrum lines.

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