

Allergic contact dermatitis to idebenone used as an antioxidant in an anti-wrinkle cream

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Contact Dermatitis Group standard series and with the antimicrobials/vehicles/cosmetics series (both from Chemotechnique Diagnostics, Malmö, Sweden). Allergens were applied on Finn Chambers® (Epitest Ltd Oy, Tuusula, Finland) mounted on Scanpor® tape (Norgeplaster Al-pharma AS, Vennesla, Norway) and on IQ Chambers® (Chemotechnique Diagnostics, Malmö, Sweden). Also, a small sample of the cream was obtained from the beauty salon and was tested. Readings were done on day 2 and day 3, and the reactions were rated according to the International Contact Dermatitis Research Group standards. The only reaction to the anti-aging cream and was rated 2+ on day 2 and 3+ on day 4. The manufacturer obligingly provided a patch testing kit, with the individual ingredients of the cream premixed in petrolatum at the concentration used in the finished product. On the 2-day reading, a 2+ reaction was obtained that became 3+ on day 4 (Fig. 1). The allergen was identified as idebenone 0.5%. No reaction was observed in 20 control subjects tested with the same ingredient.

Case Report

A 47-year-old Caucasian woman went to a beauty salon and received a facial treatment with an 'anti-aging' cream. Within 24 hr, she developed a severe, oedematous and vesicular dermatitis of the face, ears, and neck. The lesions were treated with a 2-week course of oral prednisone and lasted for 3 weeks.

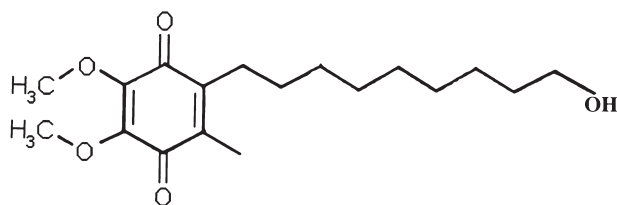
Patch testing was performed 3 months later with the North American

Discussion

Idebenone (CAS registry number 58186-27-9) is the generic name of [2,3-dimethoxy-5-methyl-6-(10-hydroxy-decyl)-1,4-benzoquinone] (Fig. 2). This potent antioxidant (1) is a synthetic analogue of coenzyme Q10 (2). It has been shown to inhibit lipid peroxidation (3), to maintain mitochondrial electron transport (3, 4), and to stimulate nerve growth factor (5). It has been used orally in the

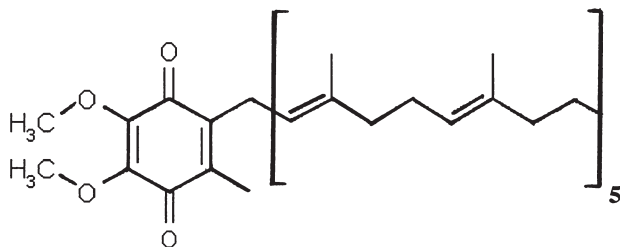


Fig. 1. Vesicular patch test reaction to idebenone on day 4.



Idebenone (CAS: 58186-27-9)
Synonyms: BRN 2001459
CV 2619

Fig. 2. Chemical structures of idebenone.



Coenzyme Q10 (CAS: 303-98-0)
Synonyms: Ubiquinone
Ubidecarenone

Fig. 3. Chemical structure of coenzyme Q10.

treatment of Alzheimer's disease, Friedreich's ataxia, cerebrovascular disease, and liver disease (2).

Idebenone-containing cosmeceuticals are now available that claim to reduce wrinkles and other signs of aging by quenching free radicals in the epidermis. Different brands incorporate this antioxidant in concentrations that vary from 0.5% to 1%. A Medline search failed to retrieve publications describing allergic contact dermatitis to idebenone or to its congener, coenzyme Q10. However, the manufacturer of the cream used by our patient informed us that it has received one report of such a reaction caused by idebenone.

Our patient had never been exposed to this particular cream before. Given that she reacted to it within 2 days means that she had already been sensitized to idebenone. Alternately, she may have acquired the sensitization by exposure to coenzyme Q10 that has been used in a large number of cosmetics for around 10 years. Due to its very long side chain, coenzyme Q10 is a much larger molecule ($C_{59}H_{90}O_4$) than idebenone ($C_{19}H_{30}O_5$), but its general chemical structure is very similar (Fig. 3), and we can speculate that cross-reactions between the two may occur.

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