# Induction of Skin Blanching by Hydrogen Peroxide

*Sir,*

Hydrogen peroxide in a unique stabilized lipid cream base (1, 2) has biological effects on the skin. In two earlier studies, the application of a 2% and 1% hydrogen peroxide cream prior to UVA exposure on a sunbed was found to prevent white spots on anoxic pressure areas from developing, the resulting pigmentation being almost uniform (3, 4). At the same time, for some of the subjects in these studies, washing off the hydrogen peroxide cream with water just prior to exposure to UV light revealed the occurrence of a temporary skin blanching. The aim of the present study was to further investigate this local blanching reaction to epicutaneously applied hydrogen peroxide cream, in different groups of subjects.

## MATERIAL AND METHODS

### *Subjects*

In the study participated 30 healthy persons with no signs of skin disorder (13 men, 17 women; age 23–61 years), 30 patients with psoriasis vulgaris (16 men, 14 women; age 21–84 years) and 30 patients with atopic dermatitis (9 men, 21 women; age 17–45 years). All were Caucasians.

### *Creams applied*

An active and a placebo cream were employed. The active cream contained hydrogen peroxide (2%), 1-glycerol monomyristate (21%), 1-glycerol monolaurate (7%) and water (70%); the ingredients of the placebo cream were the same except that hydrogen peroxide was lacking. The two creams were not identifiable by sight or smell and were supplied in identical tubes, each provided with a code sign and marked either "left" or "right".

For each subject, one of the creams was applied to the left forearm and the other to the right, symmetrical normal-looking areas of the ventral forearm skin being involved. Which forearm received the active cream was varied randomly and was of equal frequency within each of the groups, as a double-blind principle was employed. To an area previously marked by a template 3×2 cm in size about 5 mm of the ointment was applied on each arm and was first rubbed in lightly for 2 min and then washed off gently with lukewarm water. Immediately afterwards, both arm areas were observed in daylight for at least 20 min and the skin temperature was measured with a digital thermometer, both within the area treated and a few centimetres from it.

## RESULTS

In 19 of the 30 healthy subjects, use of the hydrogen peroxide cream induced skin blanching which appeared almost immediately after the cream had been washed off. The blanching was confined to the treated area and lasted for 7–15 min.

Among the patients with psoriasis, 21 of 30 showed a similar blanching reaction, which lasted for 5–12 min after the cream had been washed off.

In the atopic group the hydrogen peroxide cream caused a blanching reaction in all but 2 cases. The blanching lasted for 8–20 min and, in 3 of the patients, the blanched area exceeded the cream-treated area by 0.5 cm.

In none of the three groups did the placebo-treated contralateral areas show any blanching reaction.

In both the hydrogen peroxide- and the placebo-treated areas, a drop in surface temperature of up to 3°C was noted just after the cream had been washed off. After about 2 min the temperature had risen to the same value as for the untreated control sites a few centimetres away. The occurrence vs. non-occurrence of a blanching reaction was not found to be correlated with changes in skin surface temperature.

## DISCUSSION

Blanching of the skin has been observed after the application of a variety of different substances. There is a well-known blanching reaction caused by corticosteroids, often used as a topical test for the determination of corticosteroid activity.

A blanching of the skin after the application of an anaesthetic cream containing lidocaine and prilocaine has also been reported. The mechanism behind this reaction is unknown (5).

A transient blanching reaction to white soft paraffin that has likewise been observed has been attributed to the presence of propylene glycol (6). The cream used in the present study did not contain this substance.

A whitening of the skin after exposure to solvents has been reported as well. This skin blanching does not correspond to any decrease in blood flow found on the basis of laser Doppler flowmetry but to changes in structure and to the removal of skin lipids (7).

A blanching of the skin after contact with a 3% solution of hydrogen peroxide was reported in 1977 (8). The blanching was temporary, disappearing after 10–30 min. The phenomenon was found in all members of a group of healthy whites but was not found to occur in the skin of blacks. The authors proposed that the topical application of hydrogen peroxide induces a transient vasoconstriction of vessels in the superficial dermis. In the present study skin blanching occurred in about 2/3 of both the healthy subjects and the patients with psoriasis, and in nearly all of the atopic patients. No correlation between the blanching reaction and changes in skin temperature could be shown. However, the mechanism behind the skin blanching caused by hydrogen peroxide is still unknown.

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*Received April 6, 1994.*

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