No Photoinactivation of *Propionibacterium acnes* with Soft Laser Treatment

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Sir,

The treatment of acne with soft lasers has been and still is advertised in the newspapers [1]. In no cases, as far as is known to the authors, a rationale for a positive effect of the soft laser treatment has been given.

Propionibacterium acnes plays an important role in the acne disease [2, 3]. Our group has carried out a comprehensive study of light effects on these bacteria. One conclusion is that porphyrins, which have absorption bands in the red light region [4], play an important role in the photoinactivation mechanisms of the bacteria [5].

Irradiation of a cell suspension of *P. acnes* (for serotype, cultivation, methods [5]) with soft laser (1 mW He-Ne laser) showed that the treatment did not cause any photoinactivation of the cells after 2 h of continuous treatment. The irradiation level was 250 W/m², the light dose was therefore 1.8 MJ/m².

In experiments with incandescent red light we used much higher intensities, of the order of 8.5 kW/m². The survival curve in the figure shows that the bacteria certainly react to this red light when the doses are large enough (about 10 MJ/m²). The relation between the two irradiances and doses mentioned shows that the soft laser was at least five times too weak to exert any

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0 10 20 30 40 50 60 70

Exposure time, min

Fig. 1. Survival of *P. acnes* when irradiated with high-intensity incandescent red light. Soft laser light did not cause any corresponding reduction in survival after irradiation.

action on the survival of the bacteria even if the irradiation time was 2 h.

In addition, if the red laser light is used for in situ treatment, its intensity will decrease also when it penetrates the skin. The level will decrease to 37% at a depth of 0.5 mm [6] (or even less if the optical density is higher than in normal skin). The specific characteristics of the laser light (its coherence, monochromaticity etc.) will also change rapidly when the light penetrates the skin, and

its action will soon be equivalent to that of incandescent light sources or the sun. This makes it even more unlikely that irradiation from a soft laser (and doses recommended in commercial advertisements) can exert an action on *P. acnes*, in situ.

The present experiments show that, if soft laser irradiation causes any effects on acne, it is not mediated via an action on the *P. acnes* flora of the comedones. No arguments for the use of soft laser in acne treatment seem to exist for the time being.

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