Melanin Granula Distribution and Phagocytosis in Psoriasis Vulgaris After PUVA Therapy

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Summary. Melanin-containing basal cells of the epidermis, melanin-containing macrophages, mast cells, eosinophilic granulocytes and plasma cells were quantitatively investigated with the purpose of gaining an understanding of the quantitative changes in these cell systems under PUVA therapy. This patients have been exposed to solar radiation some weeks or months before the begin of the PUVA-treatment. Different dying-processes were used to investigate biopsy samples of psoriatically healthy and psoriatically affected skin, from 28 patients before, and 39 patients after PUVA therapy, using a 2d μm with a field of view of 0.1 mm². Altogether more than 9,000 fields of view have been analysed. The average radiation amount was 12 irradiations with an average total energy of 21.5 J/cm². It was found that the count of granula-containing basal layer cells decreases in the psoriatic “healthy” region due to pigment incontinence and increase in the psoriatically affected region. The subepidermal melanin-containing phagocytes increase in both regions to a similar extent. In the case of the mast cells there was no trend to degranulation. The count of eosinophilic granulocytes and plasma cells was unchanged.

Key words: Melanin granula distribution – PUVA – Psoriasis vulgaris – Melanin phagocytosis – Mast cells


Schlüsselwörter: Melaningranulaverteilung – PUVA – Psoriasis vulgaris – Melaninphagozytose – Mastzellen

Part of the effects of oral photochemical therapy using 8-Methoxypsoralen (8-Mop) and UVA (PUVA therapy) used on Psoriasis vulgaris is the formation of a photo-addition product between the 8-Mop and the thymine of DNA, constituting an inhibition of the cell cycle of the basal cells and an increase of pigmentation. However, UVA penetrates the corium even at comparatively low intensities, and this raises the question as to whether other in vivo cell systems are also subject to a PUVA effect. Preliminary observations of an above all initially pronounced growth of so-called clear cells, and of a long-term growth of melanin granular phagocytising macrophages were available for consideration. Consequently, our investigations on Psoriasis vulgaris under PUVA therapy aimed at a quantitative determination of the changes in melanin granula distribution in the lower layers of the epidermis and in the melanin-containing phagocytes of the dermis, further more mast cells, eosinophil granulocytes and plasma cells. PUVA treatment began in the autumn/wintertime after exposure to solar radiation with more or less improvement of the psoriasis.

Subjects and Procedure

One hundred forty skin biopsies from 28 patients before and from 39 patients after PUVA therapy were available for evaluation. The average number of irradiations was 12 (during 2–3 weeks) and average total energy was 21.5 J/cm\(^{-2}\). In both groups the patients were 15–75 years old. In the pre-PUVA therapy group there were 12 females and 16 males, and in the posttherapy group 13 women and 26 men. The biopsy samples, 2 cm long, 0.5 cm wide, were taken under local anaesthetic from the fringes of psoriatic areas, so that they contained both clinically healthy and psoriatically affected skin. The samples were preserved in formalin and embedded in paraffin.

Altogether more than 9,000 fields of view have been analysed. The following dye-processes were performed:

- Giemsa-dying after Lennert: Melanin granula in the basal layers of the epidermis. Melanin-containing phagocytes. Mast cells;
- Toluidine-dying: Melanin granula in the basal layers of the epidermis. Melanin-containing phagocytes. Mast cells;
- Plasmacells-dying: Melanin granula in the basal layers of the epidermis. Melanin-containing phagocytes. Plasma cells;