

The effect of combined ultraviolet A irradiation and oral psoralens (PUVA) on skin arachidonic acid and prostaglandin concentrations in psoriasis

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We have previously reported that the erythema produced by u.v.B (297 nm) and u.v.C (254 nm) irradiation of human skin is associated with increased concentrations of arachidonic acid and prostaglandins E_2 and $F_{2\alpha}$ (Black, Greaves, Hensby & Plummer, 1977; Camp, Greaves, Hensby, Plummer & Warin, 1978).

Sixty cm² of clinically normal skin of patients with psoriasis were irradiated with 3 times the minimum erythema dose of u.v.A (365 nm), 2 h after oral 8-methoxy-psoralen administration (0.6 mg/kg body weight), using a Philips TL 20W/09 lamp placed at a distance of 2.5 cm from the skin.

Exudate was obtained from irradiated and non-irradiated skin using a suction bullae technique (Black, Greaves, Hensby & Plummer, 1976) at 24, 48 and 72 h after irradiation. Exudate was also obtained from normal non-irradiated skin of healthy volunteers.

The exudates were examined for $PGF_{2\alpha}$ by radioimmunoassay and for arachidonic acid and PGE_2 by gas-liquid chromatography-mass spectrometry (Table 1). The concentrations of PGE_2 and $PGF_{2\alpha}$ did not differ significantly in erythematous and non-irradiated skin nor in normal skin of healthy non-psoriatic volunteers. Arachidonic acid concentrations, likewise, were not significantly different in irradiated and non-irradiated skin, although they were significantly greater than in normal healthy skin.

These results suggest that, unlike u.v.B- and u.v.C-induced erythema, u.v.A- (combined with oral psoralens) induced erythema is not associated with elevated prostaglandin concentrations. Whether the elevated concentrations of arachidonic acid in unirradiated skin of patients with psoriasis is of significance in the pathogenesis of psoriasis requires further study.

Table 1 Effect of PUVA treatment on concentrations of arachidonic acid and prostaglandins E_2 and $F_{2\alpha}$ in human skin exudate

Subjects	Non-irradiated	Psoriasis Time after irradiation (h)			Healthy non-psoriatic
		24 h	48 h	72 h	
Arachidonic acid ng ml ⁻¹	361 ± 44 n = 15	454 ± 55 n = 5 P > 0.2	393 ± 69 n = 6 P > 0.7	334 ± 63 n = 5 P > 0.7	267 ± 15 n = 85 P < 0.025
Prostaglandin E_2 ng ml ⁻¹	22 ± 2 n = 15	21 ± 1 n = 5 P > 0.6	23 ± 3 n = 6 P > 0.7	20 ± 2 n = 5 P > 0.5	19 ± 1 n = 84 P > 0.2
Prostaglandin $F_{2\alpha}$ ng ml ⁻¹	21 ± 6 n = 17	17 ± 5 n = 6 P = 0.7	21 ± 8 n = 5 P = 1.0	18 ± 4 n = 6 P > 0.6	23 ± 3 n = 107 P > 0.8

References

- BLACK, A.K., GREAVES, M.W., HENSBY, C.N. & PLUMMER, N.A. (1976). A new method of obtaining human skin inflammatory exudate for pharmacological analysis. *Br. J. Pharmac.*, **58**, 317P.
- BLACK, A.K., GREAVES, M.W., HENSBY, C.N. & PLUMMER, N.A. (1977). Increased prostaglandins E_2 and $F_{2\alpha}$ in human skin at 6 and 24 h after ultraviolet B irradiation (290-320 nm). *Br. J. Clin. Pharmac.* (in press).
- CAMP, R.D., GREAVES, M.W., HENSBY, C.N., PLUMMER, N.A. & WARIN, A.P. (1978). Irradiation of human skin by short wavelength ultraviolet radiation (100-290 nm) (u.v.C): increased concentrations of arachidonic acid and prostaglandins E_2 and $F_{2\alpha}$. *Br. J. Clin. Pharmac.* (in press).