BLOOD MONOCYTE ARYL HYDROCARBON HYDROXYLASE ACTIVITY IN PSORIASIS

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The activity of aryl hydrocarbon hydroxylase (AHH) in monocytes from 13 healthy control subjects and in 16 patients with discoid psoriasis was measured. The mean basal monocyte AHH activities of the control and psoriatic groups were 3.4 ± 0.47 and 4.46 ± 0.55 respectively ($\text{pmol 3-OHBP h}^{-1} 10^{-6}$ cells). This difference was not significant. The mean induced monocyte AHH activities in the control and psoriatic groups were 56.4 ± 10.8 and 77.8 ± 16.0 $\text{pmol 3-OHBP h}^{-1} 10^{-6}$ cells respectively but this difference was not significant. The mean induction ratios in the control and psoriatic groups were 16.5 ± 1.8 and 20.4 ± 3.6 respectively. Again, this difference was not significant. We conclude therefore, that monocyte aryl hydrocarbon hydroxylase activity is not reduced in psoriasis.

Keywords monocyte aryl hydrocarbon hydroxylase psoriasis

Introduction

The evidence for a generalised defect in aryl hydrocarbon hydroxylase (AHH) activity in psoriasis (Chapman *et al.*, 1979, 1980) has been withdrawn (Rawlins & Shuster, 1982; Finnen *et al.*, 1983) and lymphocyte AHH activity has been reported to be normal (Ruizicka *et al.*, 1980) or increased (Kraemer *et al.*, 1981) in patients with psoriasis. As it is possible that AHH activity may differ in different cell types we have now measured AHH activity in circulating monocytes of normal subjects and patients with psoriasis.

Methods

Sixteen patients with psoriasis (mean age $\pm$ s.e. mean: 39.56 ± 4.83 years) and 13 normal subjects with no evidence of skin disease (mean age $\pm$ s.e. mean 37.31 ± 3.75 years), matched for age and sex, were studied. None had received systemic or topical drug therapy in the preceding 3 weeks.

Venous blood (75 ml) was taken from each subject into bottles containing heparin to give a final concentration of 40 iu/ml and the blood was processed within 3 h of collection.

Separation of monocytes

Mononuclear leukocytes were isolated by the method

of Boyum (1968) and resuspended in Eagles Minimum Essential Medium (EMEM) with Earle's salts to which had been added 100 $\mu\text{g/ml}$ of each of penicillin and streptomycin and 2 $\mu\text{g/ml}$ of nystatin. 99% of cells at this stage are mononuclear and excluded trypan blue. Aliquots (0.5 ml) were placed in 50 ml (Sterilin) plastic culture flasks containing 4.5 ml of EMEM supplemented with antibiotics and 20% foetal calf serum (FCS) (Flow Laboratories: Lot number 29081101) which had heated to 56°C for 30 min. Cultures were incubated for 2 h at 37°C in 5% CO_2 and 95% O_2 then washed six times with 5 ml EMEM to remove non-adherent lymphocytes. To each culture, 4.5 ml of EMEM was added supplemented with antibiotics and 20% FCS and either 0.5 ml of control medium containing 1% DMSO or 0.5 ml of benzantracene (BA) medium containing 1% DMSO and 20 $\mu\text{g/ml}$ BA (Eastman Kodak Co.) to give a final concentration of 0.1% DMSO with or without 2 μg BA/ml. After incubation at 37°C in 5% CO_2 and 95% O_2 for 20 h the cells were harvested. BA treatment did not affect cell viability as assessed by trypan blue exclusion. The adherent mononuclear cells were loosened with a rubber policeman and the contents of the flasks transferred to chilled 50 ml plastic centrifuge tubes. The flasks were washed twice with 2.5 ml of Hank's balanced salt solution (HBSS), the cells sedimented at 500 g for 10 min at 4°C, washed with HBSS and resedimented for assay.

Assay of aryl hydrocarbon hydroxylase (AHH) activity

AHH activity was measured immediately after harvesting by the method of Nebert & Gelboin (1968) as modified by Kellerman *et al.* (1973), and described by Bast *et al.* (1976). The assay measures the rate of conversion of benzo (α)pyrene to 3-hydroxybenzo(α)-pyrene (3-OHBP) determined spectrofluorimetrically (Perkin Elmer).

Induction ratios were calculated from the mean activities of triplicate BA treated and untreated cultures.

Cells suspended in buffer for counting were diluted 1:1 with 0.13% trypan blue in buffer and the viable cells counted in a haemocytometer. Viability was 80–95% and the cell count was between 0.5 and 2 million viable cells per assay tube. Results are expressed as pmol 3-OHBP $\text{h}^{-1} 10^{-6}$ viable monocytes.

Statistical comparisons between the psoriatic and control group were performed using Wilcoxon's Rank Sum Test.

Results

Mean $\pm$ s.e. mean basal monocyte AHH activity was higher in psoriatics than in controls (4.46 ± 0.55 and 3.48 ± 0.47 pmol 3-OHBP $\text{h}^{-1} 10^{-6}$ cells respectively) but this difference was not statistically significant (Figure 1). Similarly, after induction with BA, induced monocyte AHH activity was greater in psoriatics than in controls (77.8 ± 16.0 and 56.4 ± 10.8 pmol 3-OHBP $\text{h}^{-1} 10^{-6}$ cells respectively) but the difference was not significant. The induction ratio was correspondingly but not significantly different between psoriatics and controls (20.4 ± 3.6 and 16.5 ± 1.8 respectively).

Discussion

The results show that both basal and induced AHH activity and the induction ratio were slightly increased

Figure 1 The basal and induced AHH activities expressed as pmol 3-OHBP formed $\text{h}^{-1} 10^{-6}$ cells and the induction ratio in 16 psoriatic patients (□) and 13 controls (■) (mean $\pm$ s.e. mean).

in patients with psoriasis, although not significantly so. Although treatment was stopped 3 weeks before the study it is possible that the slight increase may be due to persistence of induction of activity by therapy. Our findings with monocytes are similar to those previously found with lymphocytes (Ruizicka *et al.*, 1980; Kraemer *et al.*, 1981; Karki *et al.*, 1982) and exclude the possibility of a generalised defect of AHH activity in psoriasis (Chapman *et al.*, 1979, 1980). We have recently (Rawlins & Shuster, 1982) withdrawn the evidence on which that suggestion was based and have been unable to repeat the original observation on skin, gut and liver (Finnen *et al.*, 1983).

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