ALKALINE PHOSPHATASE LEVELS OF PSORIATIC AND NORMAL SKIN
(A Biochemical Study)

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Summary

Alkaline Phosphatase levels were measured in the psoriatic plaque, the uninvolved skin of psoriatic patients and normal skin. There was a 400% increase in the enzyme activity in the psoriatic plaque. The changes in uninvolved skin were not significant. Implications of this finding are discussed.

Mammalian alkaline phosphatase is an important enzyme which also serves as a pyrophosphatase[1] and so may be implicated in regulation of polymerization of D. N. A. in the cell. It has been suggested that the physiological role of alkaline phosphatase in the skin may be related to keratinization of epidermis and in the endothelium of small vessels its function could be that of aiding the transfer of materials to and from the vessels (phosphorylation and dephosphorylation[2]). In spite of the important nature of this enzyme it has only been studied histochemically in the psoriatic skin[3]. In this communication we describe, what is to our knowledge the first biochemical study of alkaline phosphatase activity in the psoriatic and normal skin.

Material and Methods

Ten uncomplicated patients with psoriasis and an equal number of normal controls were the subjects of this study. None of the patients were on any topical or systemic drugs for 4 weeks prior to biopsy. Skin biopsies of uniform thickness and 5 mm diameter were taken by a trephine after a subcutaneous injection of 2% xylocaine hydrochloride. They were quickly blotted and immediately transferred to a glass mortar pre-cooled to 20°C in a deep freeze and then kept in a deep freeze at 20° till processed for assay of enzyme activity. The enzyme activity was determined within 18 hrs of the removal of biopsies. For the assay of enzyme activity the biopsy was homogenized by grinding with 0.5 ml of 0.05 M carbonate bicarbonate buffer (0.05 M Na_2CO_3, 0.05 M Na&CO_3) and then centrifuging for 5 min. at 2000 r.p.m. at 0:C in tubes jacketed with ice to remove the cell debris. The clear supernatant was used for assay of enzyme activity. Alkaline phosphatase activity was assayed according to the method of KIND & KING[4] with the modification that the enzyme was incubated with the substrate for 4 hours prior to the estimation of the liberated phenol. Prolonged incubation periods were necessary in

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view of the low enzyme activity in skin homogenates as compared to serum. Results were expressed as μg phenol liberated / mg protein/h at 37°C. Protein was estimated according to the method of Lowry, Rosenburgh, Farr and Brandell[5]. Statistical significance was evaluated by andvalues of $P < 0.05$ considered significant.

The enzyme activity in the psoriatic plaque, the uninvolved skin of psoriatics, and the normal control skin was on the average 32 ± 5, 10 ± 2.6 and 9 ± 1.6 μg phenol liberated/mg protein/h at 37°C respectively. (Table 1.) Thus

TABLE 1

Alkaline Phosphatase Activity of Psoriatic and Normal Skin.

ug phenol liberated/mg protein/h at 37°C

S. No.	Psoriatic Skin	Univolved skin of Psoriatics	Normal Skin
1.	26	4	13
2.	23	7	9
3.	65	23	3
4.	36	6	6
5.	6	3	6
6.	31	5	19
7.	18	3	11
8.	38	20	7
9.	44	17	2
10.	32	—	11
Mean $\pm$ S.E.	32 ± 5.0 (P> 0.0005)	10 ± 2.6 (P <0.05)	9 ± 1.6

our results show nearly 400% increase in the enzyme activity in the psoriatic plaque. The changes in the uninvolved skin were not significant. The enzyme activity of the homogenates from the psoriatic plaques was completely lost on incubating the homogenates at 57°C for one hour showing that there was no ectopic production of the heat stable form (placental form) of the enzyme by the plaque.

Discussion

The reason for the tremendously increased alkaline phosphatase activity in the psoriatic plaque is not clear. Whether this is due to the increased vascularity of the plaque, or due to increased production of the enzyme or it represents an increased solubility of the enzyme from the psoriatic plaque due to alteration in the structure of the cell membranes in the plaque remains to be investigated. It is however notable that leucocyte alkaline phosphatase in psoriatics is elevated 2.5 fold over normals[6].

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