Lysozyme and IgA Concentrations in Serum and Saliva from Psoriatic Patients

BARBARA GASIOR-CHRZAN and EDVARD S. FALK

Department of Dermatology, University of Tromsø, N-9000 Tromsø, Norway

Significantly lower lysozyme concentrations were found in saliva of 15 psoriatic patients compared with controls, whereas in serum, lysozyme activity, was significantly higher than in controls. The concentrations of IgA in serum of psoriatic patients were significantly higher than in controls, whereas in patients' saliva IgA concentrations were not significantly different from the controls. The findings indicate that lysozyme and IgA may be of significance in the pathophysiology of psoriasis. Key words: Psoriasis yulparis.

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B. Gasior-Chrzan, Department of Dermatology, University of Tromsø, N-9000 Tromsø, Norway.

Several groups of workers have demonstrated that in psoriasis, polymorphonuclear leukocytes, monocytes and macrophages behave abnormally (1–4). Psoriatic patients also frequently have active lesions heavily colonized by *Staphylococcus aureus* and resident cocci without clinical signs of infection (5, 6), and severe hospital epidemics traceable to clinically healthy psoriatic patients have led to the assumption that psoriatic patients are protected against superficial bacterial invasion.

Lysozyme is a low-molecular-weight cationic protein which is synthesized in and continuously released from monocytes or macrophages (7, 8). Lysozyme found in saliva and other secretions is probably synthesized by glandular cells (9, 10). This bacteriolytic enzyme is a major constituent of the macrophages (11), and it can influence the functions of human granulocytes (7, 12) as well as lymphocytes (13). Moreover, by inactivating viruses (14) and by virtue of its antifungal effect (15) it is considered to play a role in defence mechanisms against microbiological infections.

IgA and lysozyme are also present in human skin and it is suggested that both contribute as humoral components to the skin's established cellular defence system. IgA is well known as a surface protective factor in the inactivation of microorganisms in all internal body secretions. Moreover, a close linkage between lysozyme and secretory IgA has been suggested (9), and recently we found significantly reduced values of both lysozyme and IgA in saliva of patients with atopic dermatitis (16). Reports on the activity of lysozyme in serum of psoriatic patients, however, have been conflicting (17, 18), whereas IgA levels in serum are commonly found to be elevated (19).

This study was designed to investigate whether lysozyme and IgA as inflammatory- and immuno-modulating factors may add new pieces to the puzzle of psoriasis.

MATERIAL AND METHODS

Patients

Fifteen patients, aged 24 to 51 years (average 38 years), with active plaque psoriasis involving 5–10% of the skin surface, and not complicated by arthritis, were studied. None of the patients studied had been receiving systemic steroids or immunosuppressive drugs for the last 6 months. No other systemic therapy or phototherapy was given at the time of the study.

Fifteen healthy medical students with no history of psoriasis served as controls.

Serum preparation

Blood samples were collected by venepuncture and allowed to clot for 30 min at room temperature. The sera were then separated by centrifugation at $800 \times g$ for 10 min and stored at $-20^{\circ}\mathrm{C}$ until required.

Saliva preparation

Saliva samples were taken in the morning before breakfast and tooth-brushing, placed in plastic tubes and immediately stored at -20° C.

Lysozyme determination

The procedure of measuring the lysozyme activity by a lysoplated method has been described previously (20). In brief, 40 µl of the solution to be tested was applied in wells in 1% agarose (Litex, Denmark) containing 0.5 g/l dried *Micrococcus lysodeicticus* (Sigma Chemical Company, USA). Both agarose and lysozyme standard were dissolved in 15 M phosphate buffer, pH 6.3. The agar plates were then incubated at 37°C for 22 h. The diameters of the zones were finally

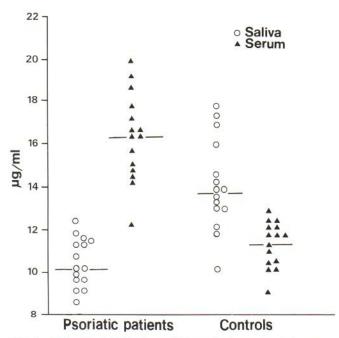


Fig. 1. Lysozyme activity in psoriatic patients vs. controls. ——Median value.

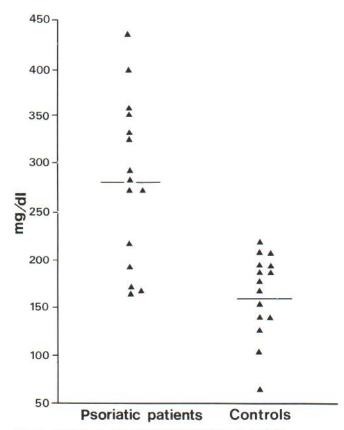


Fig. 2. Serum IgA values in psoriatic patients vs. controls.

compared with a standard curve obtained with hen egg-white lysozyme.

IgA determination

The IgA concentrations in the sera and saliva were determined using the Beckman Errey Proteins System (ABK TEK Company, Norway).

The resulst are expressed as median values, as the variables are not normally distributed. The median concentrations were compared by the methods of Wilcoxon and Mann-Whitney.

RESULTS

The median lysozyme concentration in psoriatic patients' serum was 16.3 μ g/ml, compared with 11.2 μ l/ml in controls (Fig. 1). This difference is statistically significant (p<0.01). By contrast, the median lysozyme activity in psoriatic patients' saliva was 10.2 μ g/ml, compared with 13.7 μ g/ml in controls (p<0.02).

The median concentration of IgA in serum was higher (280 mg/dl) (p < 0.01) in psoriatic patients than in controls (160 mg/dl) (Fig. 2). The median IgA concentration in saliva of psoriatic patients, however, (10.2 mg/dl) was not significantly different from that in controls (9.5 mg/dl) (Fig. 3).

DISCUSSION

The role of lysozyme in immunological and inflammatory reactions is incompletely understood. An increase of serum and salivary lysozyme concentrations in myeloproliferative (20)

and some autoimmune (21) diseases has previously been reported. On the other hand, reduced salivary lysozyme and IgA concentrations have been demonstrated in patients with atopic dermatitis (16). The distinct inter-relationship between salivary IgA and lysozyme could suggest a close relationship in the secretory mechanisms of these two substances. The reduced lysozyme values in saliva of psoriatic patients raise interesting speculations. Both lysozyme and IgA are normally present in abundance in external secretions, but only in small amounts in serum, pleural and cerebrospinal fluid. None of the psoriatic patients investigated here had any concomitant disease which could explain the reduced production of salivary lysozyme. Thus, the somewhat lysozyme levels found in saliva are most likely attributable to the disease process and may reflect a higher consumption of the enzyme. Alternative explanations for the low values are reduced production, biological variation of the enzyme activity, and presence of inhibitors.

In psoriatic patiens there is a considerable disparity among the findings of serum lysozyme activity (17, 18), whereas IgA levels in serum are commonly found to be elevated (19, 22). The markedly increased lysozyme concentrations which we observed in serum of patients with active plaque psoriasis may have been caused by increased degranulation of polymorphonuclear leukocytes by intensified phagocytosis or chemotactic activity, or by activation of monocytes or macrophages whereby these cells release and synthesize lysozyme. However, the relationship this bears to the proliferative changes in the epidermis of psoriasis has yet to be elucidated. The findings of elevated serum IgA levels in psoriatic patients (Fig. 2) might be a reflection of increased general immunological activity in the psoriatic patients.

The present paper focuses on concerted factors which may act in psoriasis. It is highly likely, however, that what we have described here is only part of a larger picture comprising several other known and unknown factors. Further studies are under way in our laboratories.

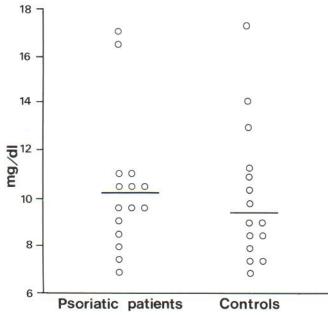


Fig. 3. Saliva IgA values in psoriatic patients vs. controls.

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