

Tear Lysozyme in Lepromatous Leprosy¹

Dhan Krishna Sen and Guatam Sarup Sarin²

Lysozyme is of interest because of its antibacterial activity. It is most abundant in normal tears and the bulk of it is presumed to be synthesized locally. The concentration of lysozyme in tears has been found to be diminished in lupus erythematosus⁽⁵⁾, Sjogren's syndrome⁽¹⁻¹⁰⁾ and *Herpes simplex* keratitis⁽³⁾. Although there is information on the concentrations of lysozyme in the serum of leprosy patients⁽⁶⁾, no report regarding its concentration in the tears of such patients is available.

In this study, we have measured the concentration of lysozyme in tears in lepromatous leprosy patients and compared it with that in the tears of healthy people.

MATERIALS AND METHODS

The study was carried out among 47 untreated lepromatous leprosy patients attending the Hansen Clinic of Lok Nayak Jai Prakash Narain Hospital, New Delhi. The cases were diagnosed on the basis of the clinical picture, slit smear examination for acid-fast bacilli, and histopathological examinations. The patients had a mean age of 38.9 years (range 24 to 65 years). There were 30 males (mean age 38.4 years; range 24 to 60 years) and 17 females (mean age 40.7 years; range 30 to 65 years). In 31 of them the eyes were clinically normal and in the remaining 16 cases there was evidence of active anterior uveitis. Patients having disease either in the eye or in any other part of the body other than lepromatous leprosy were excluded from this study.

Fifty healthy people of a similar age group were chosen consecutively from the Out-patient Department of Guru Nanak Eye Centre, New Delhi, to serve as controls. They had no evidence of ocular or systemic disease and had attended the Eye Centre

mainly for the purpose of refraction. Their mean age was 44.5 years (range 26 to 65 years). There were 29 males with a mean age of 47.5 years (range 26 to 65 years) and 21 females with a mean age of 40.4 years (range 26 to 53 years).

Tear samples were collected for normal persons and leprosy patients by a method described earlier⁽⁸⁾. The samples were stored at -20°C until assayed. Lysozyme in the samples was quantified by a single radial immunodiffusion method⁽⁹⁾. Mono-specific rabbit anti-human lysozyme serum and the reference standard were commercially obtained from Behring Institute, West Germany. The concentrations of lysozyme in the tear samples were calculated from the calibration curve constructed by incorporating three known concentrations of standard for every set of lysozyme determinations.

RESULTS

Healthy individuals had mean tear lysozyme concentrations of 1.34 mg/ml (The Table). The differences between males and females were not statistically significant. Untreated lepromatous leprosy patients had significantly lower tear lysozyme concentrations (1.00 ± 0.10) than healthy controls ($p < 0.01$). The differences between those lepromatous leprosy patients with evidence of anterior uveitis and those with clinically normal eyes were not statistically significant.

DISCUSSION

The "lysoplate" method of Bonavida and Sapse⁽²⁾ is commonly employed at present for the estimation of lysozyme concentrations in tear samples. This method is based on the enzymatic action of lysozyme which lyses the cell wall of *Micrococcus lysodeikticus*. In this study, we have employed a radial immunoassay technique for estimating lysozyme. The mean concentration of lysozyme in normal human tears by the radial immunoassay technique is 1.34 mg/ml. It may be noted that this concentration is

¹ Received for publication on 28 December 1981; accepted for publication on 4 February 1982.

² D. K. Sen, M.S., Associate Professor; G. S. Sarin, B.Sc., Senior Scientific Assistant, Department of Ophthalmology, Maulana Azad Medical College, Lok Nayak Jai Prakash Narain Hospital, and Guru Nanak Eye Centre, New Delhi, India.

THE TABLE. Tear lysozyme concentrations. Values are mean \pm S.E.M. mg/ml.

Subjects	Mean \pm S.E.M. (N)
Health controls	1.34 \pm 0.07 (50)
Males	1.36 \pm 0.10 (29)
Females	1.31 \pm 0.10 (21)
Lepromatous leprosy patients	1.00 \pm 0.10 (47) ^a
Without anterior uveitis	1.01 \pm 0.15 (31)
With anterior uveitis	0.99 \pm 0.11 (16)

^a $p < 0.01$, Student's *t* test compared to healthy controls.

lower than the concentration (1.7 mg/ml) reported by Bonavida and Sapse⁽²⁾ in normal human tears. This supports the contention of Johansson and Malmquist⁽⁴⁾ that bacteriolytic lysozyme determination may not be a specific enzyme assay and that the bacteriolysis is probably influenced to some extent by factors other than the lysozyme activity.

Lepromatous leprosy causes widespread changes in different tissues of the body. Rea and Taylor⁽⁶⁾ reported elevation of serum lysozyme in leprosy patients and attributed this to increased production by the monocytic cells comprising leprosy granulomas. Scheinberg, *et al.*⁽⁷⁾ reported a trend toward higher serum lysozyme levels in lepromatous leprosy patients compared with their control group. However, to the best of our knowledge, no previous report is available on the concentration of lysozyme in tears in patients with leprosy. We have found that the lysozyme concentration in tears of lepromatous leprosy patients is significantly low when compared with that in healthy people. This low concentration in leprosy patients is probably due to a decreased local production of lysozyme as a result of subclinical structural changes in the lacrimal gland and tubules caused by the disease. Anterior uveitis is one of the common ocular afflictions of lepromatous leprosy but this *per se* did not appear to alter the lysozyme concentration in tears.

SUMMARY

Lysozyme concentrations have been estimated in 47 patients with lepromatous leprosy and in 50 healthy people by a single radial immunodiffusion technique using monospecific antiserum against human ly-

sozyme. In healthy people the mean tear lysozyme concentration was 1.34 mg/ml. In leprosy patients the mean tear lysozyme concentration was 1.0 mg/ml. Anterior uveitis *per se* did not appear to alter the lysozyme concentration in tears.

RESUMEN

Usando una técnica de inmunodifusión radial y un antisuero monoespecífico contra lisozima humana, se midieron las concentraciones de la enzima en 47 pacientes con lepra lepromatosa y en 50 individuos sanos. En los controles sanos, la concentración media de lisozima en lágrimas fue de 1.34 mg/ml, en tanto que en los pacientes ésta fue de 1.0 mg/ml. La uveítis anterior *per se* no pareció alterar la concentración de lisozima en lágrimas.

RÉSUMÉ

Chez 47 malades atteints de lèpre lépromateuse, et chez 50 témoins normaux, on a estimé les concentrations de lysozyme au moyen de techniques d'immunodiffusion radiale utilisant un antiserum monospécifique contre la lysozyme humain. Chez les personnes normales, la concentration moyenne de lysozyme dans les larmes était de 1.34 mg/ml. Chez les malades atteints de lèpre, la concentration moyenne de lysozyme dans les larmes était de 1.0 mg/ml. Une uveïte antérieure n'apparaît pas en soi comme une cause d'altération de la concentration du lysozyme dans les larmes.

Acknowledgment. Thanks are due to Dr. Ratan Singh, Professor of Dermatology, Maulana Azad Medical College, New Delhi, for permitting us to conduct this study on his cases.

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