

## **FAILURE OF LEVAMISOLE TO RESTORE *IN VITRO* LYMPHOCYTE RESPONSIVENESS IN LEPROMATOUS LEPROSY PATIENTS**

Sir,

Leprosy exists in two polar forms: high-resistance tuberculoid (TT) and low-resistance lepromatous leprosy (LL). Borderline forms exist between the two extremes. In LL, cell-mediated immune responses to *Mycobacterium leprae* are depressed,<sup>1, 3</sup> although the nature of the defect has not been established.

Levamisole, an antihelminthic drug, restores defective *in vitro* T-lymphocyte responses,<sup>6-8</sup> though it does not restore cutaneous delayed hypersensitivity to lepromins in leprosy patients.<sup>5</sup> We report the effect of levamisole on the depressed *in vitro* responses to *M. leprae* antigens and tuberculin PPD in lepromatous leprosy patients.

Fourteen Ethiopian patients (6 females and 8 males, mean age 23, range 12–36 years) were studied. Eleven of the patients had either borderline lepromatous (BL) or LL and 3 had borderline tuberculoid (BT) leprosy. The patients were untreated except for 5 patients in the lepromatous group who had been treated with dapsone for periods from 2 weeks to 20 years prior to the study.

Peripheral blood lymphocytes from these patients were stimulated in the lymphocyte stimulation test (LST) with either sonicated *M. leprae*, 10<sup>6</sup> bacilli/ml, of human origin or tuberculin PPD, 1 µg/ml. Freshly diluted levamisole (kindly provided by Janssen Pharmaceutica, Belgium, through Dr J Symoens) was added at the start of the cultures at concentrations varying from 0.1 µg/ml to 100 µg/ml.

We found that levamisole did not significantly enhance the depressed *in vitro* lymphoproliferative responses to *M. leprae* in LL patients, and in BT patients the drug did not alter the response to *M. leprae*. Levamisole added to cultures of lymphocytes from the same patients did not influence the *in vitro* response to PPD either.

Levamisole possesses immunostimulating properties and has been reported to restore defective cutaneous delayed hypersensitivity in cancer patients,<sup>2, 10</sup> to influence the clinical course of malignancies<sup>11</sup> and it has been suggested that levamisole may be of therapeutic value in conditions associated with excessive suppressor T-cell functions.<sup>4</sup> We found that levamisole did not enhance the depressed *in vitro* T-cell responsiveness to *M. leprae* antigens in LL patients. This is in agreement with previous reports that levamisole did not alter the lepromin reaction or lead to clinical improvement in leprosy patients, especially LL,<sup>5, 9</sup> and suggests that the nature of the defect in lepromatous leprosy is different from cases where levamisole is reported to have immunostimulating properties.

LIV J REITAN

*Institute for Experimental Medical Research  
Ullevaal Hospital, Oslo, Norway*

AYELE BELEHU

*Armauer Hansen Research Institute  
PO Box 1005, Addis Ababa, Ethiopia*

## References

- 1 Bapat CV, Modak MS, DeSouza NGA, Chulawalla RG. Comparative study of skin reactions in leprosy patients to *M. leprae*-lepromin and to ICRC-IN, an antigen from cultivable acid-fast bacilli from *M. leprae* isolated from lepromatous nodules. *Leprosy in India*, 1977; **49**: 472.
- 2 Brugmans J, Schuermans V, DeCock W, Thienpont D, Janssen P, Verhaegen H, Van Nimmen L, Louwagie AC, Stevens E. Restoration of host defence mechanism in man by levamisole. *Life Sci*, 1973; **13**: 1499.
- 3 Godal T. Immunological aspects of leprosy—present status. *Prog Allergy*, 1978; **25**: 211.
- 4 Hersey P, Ho K, Werkmeister J, Abele U. Inhibition of suppressor T cells in pokeweed mitogen-stimulated cultures of T and B cells by levamisole *in vitro* and *in vivo*. *Clin exp Imm*, 1981; **46**: 340.
- 5 Meyers WM, Kvernes S, Staple EM. Failure of levamisole to alter the lepromin reaction. *Amer J Trop Hyg*, 1975; **24**: 857.
- 6 Pabst HF, Crawford JA. L-tetramisole: enhancement of human lymphocyte response to antigen. *Clin exp Imm*, 1975; **21**: 468.
- 7 Renoux G. Modulation of immunity by levamisole. *Pharmac Ther A*, 1978; **2**: 397.

- <sup>8</sup> Scheinberg MA, Santos L, Mendes NF, Musatti C. Decreased lymphocyte response to PHA, Con-A, and calcium ionophore (A23187) in patients with RA and SLE, and reversal with levamisole. *Rheumatoid Arthritis and Rheumatism*, 1978; **21**: 326.
- <sup>9</sup> Sher R, Wade AA, Joffe M, Kok SH, Imkamp FMJH, Simson IW. The *in vivo* and *in vitro* effects of levamisole in patients with lepromatous leprosy. *Int J Lepr*, 1981; **49**:159.
- <sup>10</sup> Tripodi D, Parks LC, Brugmans J. Drug-induced restoration of cutaneous delayed hypersensitivity in anergic patients with cancer. *N Engl J Med*, 1973; **289**: 354.
- <sup>11</sup> Verhaegen H, DeCock W, DeCree J, Verbruggen F, Verhaegen-Declercq M, Brugmans J. *In vitro* restoration by levamisole of thymus-derived lymphocyte function in Hodgkin's disease. *Lancet*, 1975; **i**: 978.