Lepr Rev (1993) **64,** 302–311

Field trials on the use of *Mycobacterium w* vaccine in conjunction with multidrug therapy in leprosy patients for immunotherapeutic and immunoprophylactic purposes

R. WALIA,* K. G. SARATHCHANDRA,* R. M. PANDEY,* S. K. PARIDA,* S. A. ZAHEER,* H. K. KAR,† A. MUKHERJEE,‡ R. MUKHERJEE* & G. P. TALWAR*

**Microbiology Division, National Institute of Immunology, Shaheed Jit Singh Marg, JNU Complex, New Delhi-110 067, India; †Department of Dermatology, Venereology & Leprology, Dr. RML Hospital, New Delhi, India; and ‡Institute of Pathology, Indian Council of Medical Research, Safdarjang Hospital Campus, New Delhi, India*

Accepted for publication 5 July 1993

Summary A double blind field trial was started with a candidate anti-leprosy vaccine, *Mycobacterium w* as an immunotherapeutic and immunoprophylactic agent against leprosy in a highly endemic region with a prevalence rate of over 18 per 1000 population. By 31 August 1992, 224 villages have been surveyed, covering a population of 307,981 (1981 census). A total of 979 MB patients and 2801 PB patients have been registered. A total of 19,453 household contacts of leprosy patients have been examined for clinical signs of disease, of which 16,519 have received the initial dose while 10,434 have also received the booster dose of vaccine/placebo. The aims and objectives, study design of the trial, present status as well as the socio-cultural aspect involved are highlighted in this paper.

Introduction

A potential leprosy vaccine, based on a cultivable, rapid growing, non-pathogenic bacillus, *Mycobacterium w* (*M.w*), was proposed by Talwar *et al.* in 1978.[1] This bacillus was identified by its ability to elicit cell-mediated immune reactions similar to those evoked by *M. leprae* with cells from tuberculoid leprosy patients.[2–5] It had, in addition,

Correspondence should be addressed to: Dr R Walia, Microbiology Division, National Institute of Immunology, Shaheed Jit Singh Marg, New Delhi-110 067, India.

0305-7518/93/064302+10 $01.00

antigens that evoked *responses* from cells of lepromatous leprosy patients, which otherwise have poor blast transformation and cytokine production with *M. leprae*. The presence of B- and T-cell determinants on *M.w*, common to *M. leprae*, has recently been confirmed by other criteria.[6,7] *M.w* is the code word by which this bacillus was investigated experimentally. Though it has growth and metabolic characteristics similar to mycobacteria currently listed in Runyon Group IV, it differs from them, in its biochemical properties, in several respects—it can be distinguished from *M. phlei* and *M. vaccae* by being non-pigment producing, and *M.w* is urease negative, in contrast to *M. fortuitum*, *M. smegmatis* and *M. chilae* which are urease positive. Furthermore *M.w* is distinguishable from *M. smegmatis* by sugar fermentation and lack of utilization of acetamide as sole nitrogen source and arabinose and fructose as sole carbon source.[8,9] The proof that *M.w* is a unique strain was obtained by identification of a signature sequence in the highly conserved 5′ coding region of 65 kd antigen gene. *M.w* DNA was amplified using primers TB1-5′GAG ATC GAG CTG GAG GAT CC and TB2-5′AGC TGC AGC CCA AAG GTG TT, as previously described.[10] The amplified product DNA of 383 bp in size was cloned and sequenced. Comparison of the sequence with *M. bovis* BCG, *M. avium*, *M. paratuberculosis* and *M. fortuitum* which represent other groups revealed a specific signature sequence at bp position No. 121 (T instead of C) and at bp No. 130 (C instead of G), suggesting *M.w* as a unique strain (if not a unique species) of mycobacteria (Khandekar *et al.*, personal communication).

The vaccine consists of autoclaved suspensions of *M.w* in sterile saline. After due completion of toxicology studies, drug regulatory and ethical approvals, the vaccine has undergone Phase I and Phase II clinical trials. It is being assessed for comparative immunoprophylactic properties with the WHO sponsored vaccine, consisting of live B.C.G. and killed *M. leprae* in the Chengalpattu District of South India. In that trial *M.w* vaccine is being administered to about 35,000 members of the general population, in contrast to our trial where only high-risk household contacts of leprosy patients have received *M.w* vaccine. Thus the results of the trial at Chingalpattu will supplement our knowledge of the efficacy of *M.w* as an immunoprophylactic agent in the general population. The vaccine has also shown important immunotherapeutic effects in controlled trials conducted on active multibacillary (MB) leprosy patients where it was given as an adjunct to chemotherapy in the test group in 2 hospitals in New Delhi. Inclusion of the vaccine resulted in a faster bacterial clearance and the hastening of clinical recovery.[11]

In some patients the effect was dramatic—a lepromatous leprosy (LL) patient with a bacteriological index (BI) of 6+ showed bacteriological negativity and clinical inactivity after 15 months of chemo-immunotherapy.[12] Similar results have been obtained on a larger series of over 300 patients on whom the code has been recently opened. Another important histological action of the vaccine is the clearance of dermal granulomas. A statistically significant number of multibacillary (MB) patients (78·84%) given immunotherapy with *M.w* vaccine demonstrated either an upgrading or a clearance of granuloma from the lesions.[13] These studies underscore the important role that the vaccine can play in the treatment of leprosy. Another feature of vaccination with *M.w* was the conversion of about 80% of lepromin negative MB patients to lepromin positivity status.[14]

Immunotherapeutic trials with the vaccine gave highly satisfactory results, suggesting the wider use of the vaccine in leprosy control programmes. Shortening of the recovery period implies savings on the cost of drugs and medical care. A quicker fall of B.I. would

also lessen the infection load and be of benefit to the community. A major question arose as to whether inclusion of the vaccine in the regime approved by WHO for MDT, which is adopted in the National Leprosy Eradication Programme (NLEP), is feasible in the field. A trial for this purpose was approved by an expert group under the chairmanship of the Director of Indian Council for Medical Research (ICMR) and by the Drug Controller of India. This communication gives the protocol of this trial and also reports the progress achieved in its implementation over the last 2 years. We also discuss our strategies to attain a high compliance rate amongst vaccinees.

In trials combining immunotherapy with chemotherapy, another issue investigated is the immunoprophylactic benefit, if any, to household family members and contacts of leprosy patients.

Analysis of the results of vaccination in the present trial will be carried out at the end of 3 years from the start of the study, and again at the end of 6 and 9 years. Comparison between these 3 re-surveys will give a definite indication of the effect of vaccination on the incidence and prevalence rates of leprosy in the study area.

Aims and Objectives

The aims of the trials are to confirm:

1 the immunotherapeutic efficacy of the *M.w* vaccine under field conditions in MB leprosy patients when administered in conjunction with MDT, in terms of clinical improvement and bacterial clearance in comparison with MDT alone;
2 the incidence of reactions and their management in field conditions;
3 the immunoprophylactic effect of the vaccine in the contact population of both multi- and paucibacillary cases of leprosy in an endemic area;
4 the trend of leprosy in the study area under various modes of treatment with respect to incidence and prevalence rates; and
5 the benefits, if any, of including the vaccine with the present MDT for control of leprosy.

Study Area and Trial Size

The pre-MDT surveys conducted by the NLEP in 1988–89 recorded the prevalence rate of leprosy in the rural Leprosy Control Unit (LCU) of Ghatampur, within the district of Kanpur Dehat in the North Indian state of Uttar Pradesh, to be 18·19/1000 inhabitants. This region was selected to synchronize with the initiation of MDT in this LCU. In choosing a rural settlement, a consideration was that the population would not be migratory in large numbers over the observation years.

The trial size was calculated based on the following statistical presumptions:

(a) that the proportion of new cases (both MB and PB) in the contact population was 2·5 times higher than the proportion of new cases in the general population;
(b) that the initial incidence rate of leprosy in the general population was 10% of the prevalence rate; and
(c) that the percentage of dropouts during the follow-up period would be around 30%.

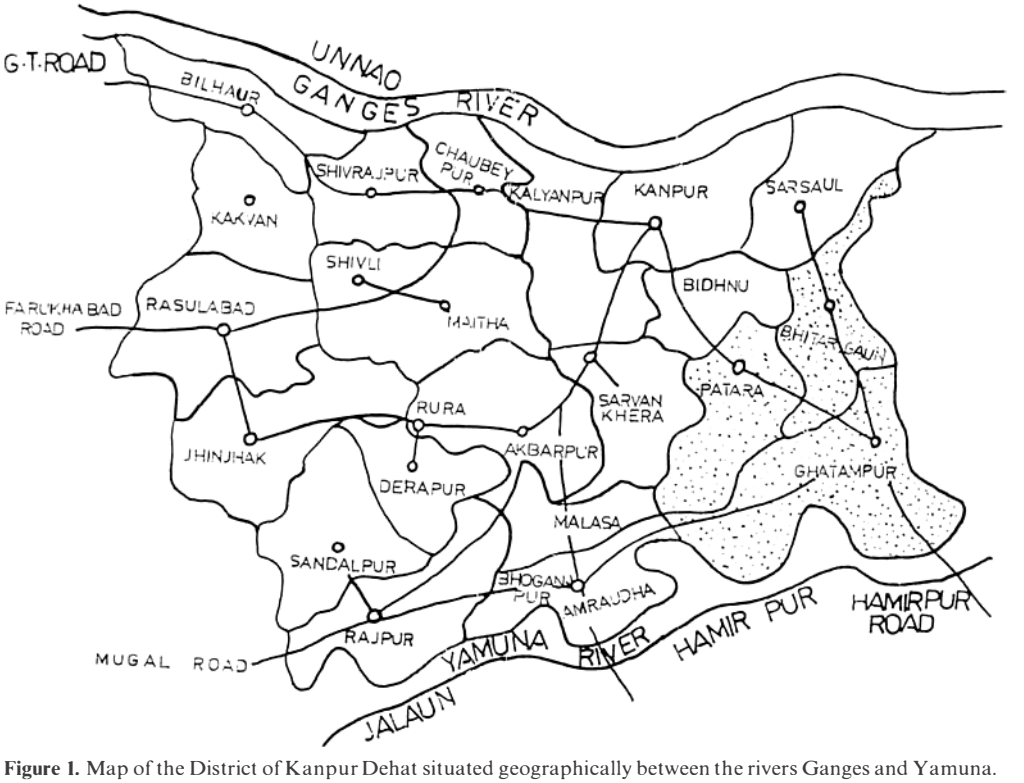

Figure 1. Map of the District of Kanpur Dehat situated geographically between the rivers Ganges and Yamuna. All the Community Blocks of the District are shown with the shaded portion depicting the 3 Community Blocks—Ghatampur, Patara and Bhitargaon—which form the study area for the present trial. These 3 Community Blocks have a population of 362,000 (1981 census) with a prevalence rate for leprosy of 18·19 per 1000 population.

A desired reduction in the proportion of new cases—i.e. a vaccine efficacy of 60% for a 10% level of significance (1-tailed test) and an 80% power of significance reckoned the trial size as 366,704 people.

The shaded area of Figure 1 shows the geographical location of the 3 community blocks within the LCU of Ghatampur with a total population of 362,000 (1981 census), which is almost the same as the calculated trial size for the study.

Study Group and Double Blind Coding

According to the trial protocol, the vaccine was to be administered to MB patients (LL, BL and BB types of leprosy) and to contacts of both PB and MB patients who are the high risk group for developing leprosy. Both MB and PB patients received MDT in accordance with the NLEP schedule.

Since the prevalence rate of leprosy in the community under study was high, each village in the block had an almost similar risk of leprosy occurrence. With this in view, the villages were divided on a purely random basis into 'experimental' and 'control' categories. Individuals in the experimental villages received *M.w* vaccine, while those in

the control villages received the placebo. For immunotherapy, the vaccine dose was 1×10^9 killed bacilli in 0·1 ml of saline. The vaccine was given intradermally in the left deltoid region. Subsequent injections contained 5×10^8 killed bacilli given at intervals of 3 months up to a total of 8 doses, alternating between the right and left deltoid areas. The placebo consisted of $\frac{1}{8}$ dose of the standard tetanus toxoid, dispensed in an equivalent volume (the idea was to provide a full dose of tetanus toxoid at the end of 8 injections). The initial doses of the vaccine/placebo were dispensed in clear vials, while the booster doses were dispensed in coloured vials. Each vial has a volume of 1·2 ml and provides up to 10 vaccine/placebo doses. The utilization efficiency ranged from 75% to 80%. For immunoprophylaxis, individuals in the experimental villages who were healthy family contacts of both MB and PB patients received *M.w* vaccine—2 doses of the vaccine were injected at 6-month intervals.

The target population was thus divided into 4 groups as follows:

Group	*Patients*	*Healthy contacts*
I	MDT + placebo	placebo
II	MDT + placebo	*M.w* vaccine
III	MDT + *M.w* vaccine	placebo
IV	MDT + *M.w* vaccine	*M.w* vaccine

Comparison between groups I and II will indicate the immunoprophylactic effect and that between groups I and III the immunotherapeutic effect, whereas the group I and group IV comparison will indicate the effect of combined immunoprophylactic and immunotherapeutic treatment.

Vials containing the vaccine and placebo were coded in a double-blind manner by the Institute for Research in Medical Statistics of the Indian Council of Medical Research (ICMR), New Delhi. The codes are kept with the ICMR. There are 8 types of vials, which can be distinguished from the first 2 characters of the code printed on the vials. Vials P1 to P4 are meant for immunotherapy while vials C1 to C4 are meant for immunoprophylaxis. The subsequent numbers after the first 2 characters denote the serial number of the vials within each type—e.g. Vial No. P1/117 denotes that the vial contains vaccine/placebo meant for immunotherapy to patients in the first group and is the 117th vial in this group.

All the villages in the trial area were stratified on the basis of prevalence rate of leprosy and the population of the villages to ensure comparable numbers of patients and contacts in all the 4 groups. Coding was done at the village level and since each village was to be allocated to 1 of the 4 groups, villages in each of the stratification categories were divided into clusters of 4 and then randomly allocated to 1 of the 4 groups with the help of a random number table.

Organizational and Operational Aspects

The trial is being jointly run by the NLEP Division of the Directorate General Health Services, Uttar Pradesh, and the field unit of the National Institute of Immunology, New Delhi. The organizational setup of the NLEP has been utilized for purposes of vaccination, and active support from the non-medical assistants (NMA) in the NLEP team helped the vaccination process. The baseline data on index cases of leprosy, and their addresses, were made available by the NLEP Unit, Uttar Pradesh, on the basis of the pre-

MDT survey carried out in 1988–89, and these data were used for the initial survey and vaccination. The villages are visited by the vaccinating team, along with the NMA catering to these particular villages, on days that do not clash with the primary duty of drug distribution. Before vaccinating anyone in a particular village, consent of the village headman, who is elected to represent the village, is obtained in a written format. The headman is made aware of the morbidity of the disease and of the potential benefits of the vaccine, and he is also told that the inhabitants might be receiving an injection which would be helpful against tetanus. A complete house-to-house survey is carried out as far as possible, and patients already registered with the NLEP are examined. The potential benefits of the vaccine are explained to these patients and their household contacts then they are all examined clinically, and only then is the vaccine administered.

Data Maintenance

Each patient (MB or PB) is registered in a separate proforma and given a number. There are separate series of numbers for MB and PB patients. There is provision in the proforma for recording the double-blind code group as well as the Circuit where the village the patient lives in falls As an example, an MB patient, Birender, from the village of Tikwapur of the coded group I belonging to Circuit C was registered as the 928th MB patient. His individual number is recorded as C928/I, the 1st letter indicating the circuit and the next 3 digits the MB patient number and the last Roman digit after the slash indicating the Group where that village falls.

The proforma also gives details of the eligible contacts of and their relationship to the index case. Most of the information generated in the field is recorded in the proforma. These proformas are then handed over to the statistics section of the field unit where data entry and verification is calculated using a Personal Computer based system. A detailed computer program package has been developed to facilitate analysis and consistency checking. This package includes programs that analyse changes in clinical status using Ramu's clinical scoring system,[15,16] as well as lepromin conversions, bacterial indices fall and histopathological trends, all of which are monitored at regular intervals in the MB patients.

Progress of the Trial

By 31 August 1992, 224 villages with a population of over 300,000 had been covered. A total of 3060 leprosy cases (979 MB and 2081 PB) were detected in this population. Table 1 gives the break-up of these cases into various groups and villages—24·7% were of the MB type. The prevalence rate was around 10/1000 population, which works out to be lower than the record of the initial survey carried out in this district before initiation of the MDT programme.

The exact number of migrating patients cannot be known exactly, as this information was not volunteered by the villagers. However, our survey demonstrated that a number of cases included in the pre-MDT survey list of NLEP were not true cases of leprosy. These cases were, for example, psoriasis, tinea, nevi and vitiligo. Furthermore, we detected 765 leprosy cases which were not originally counted in the NLEP survey. These could either be

Table 1. Trial coverage as on 31 August 1992

Group (code)	Number of villages	Population (1981)	Total cases seen		New cases seen*	
			MB	PB	MB	PB
P1, C1	54	77,819	237	789	27	177
P2, C2	58	73,024	251	678	37	141
P3, C3	65	87,901	242	665	26	124
P4, C4	47	69,237	249	669	49	184
Total	224	307,981	979	2801	139	626

* Leprosy cases not figuring in the pre-trial NLEP Survey.

cases which developed after the initial survey was conducted in 1988, or they were missed at the original survey, as this was conducted primarily by non-medical persons, even though trained in leprology. (Another reason could be that even after detection these cases had failed to turn up when called for registration for MDT.)

Vaccine or placebo was given to all active MB cases and will be repeated at 3-month intervals for 2 years. The 19,453 contacts of all leprosy cases, MB or PB, were all eligible to be given the vaccine/placebo for immunoprophylaxis. It was possible to immunize 16,519 (84·9%) contacts. The break-up as per coded groups is given in Table 2. The booster dose of immunoprophylaxis at 6 months was given to 10,434 contacts and it is expected that all contacts immunized initially will be given the booster dose. The new patients detected by us were registered by the NLEP team and MDT was given to them. The trial was therefore helping the NLEP to discover more cases and thus reduce the reservoir of infection. Similarly we also recorded the new cases detected by the NLEP team and vaccination was provided to them and their household contacts. The 2 teams were thus complementing each other for the ultimate benefit of the general population.

Reactions to vaccination

There was no clinically apparent systemic reaction to vaccination in either patients or their contacts. However, there was an instance of a hypersensitivity reaction with a generalized maculopapular, erythematous eruption. This case was treated with a short course of systemic steroids and antihistaminics which resulted in subsidence of the rash.

Table 2. Contacts of leprosy patients vaccinated

Group	Eligible contacts	First dose	Booster dose
C1	5212	4435	2520
C2	5075	4204	2859
C3	4422	3855	2756
C4	4744	4025	2229
Total	19,453	16,519	10,434

Table 3. Number of patients experiencing leprosy Types I and II reactions

	Total reaction cases*		Onset post-vaccination	
Group	Type I	Type II	Type I	Type II
P1	9	6	1	2
P2	8	3	4	1
P3	12	8	0	3
P4	13	8	6	1
Total	42	25	11	7

* Amongst all MB patients registered in the study.

At the site of the intradermal vaccination there developed in 1 week an erythematous papule or nodule, which healed in 3–4 weeks, giving rise to a healthy scar. Due to scratching of the site a secondary infection developed in about 3%. This was because of a lack of personal hygiene. A short course of local and/or systemic antibiotics was given in such cases.

Amongst the patients, there was a more or less similar incidence of Types I and II leprosy reactions in all 4 groups (Table 3) with 1–2 patients in each group developing neuritic reactions. These patients were detected early and given treatment with aspirin as well as other nonsteroidal anti-inflammatory (NSAID) drugs to prevent neurological deficits; 3 cases with non-healing plantar ulcers had to be admitted into the district hospital.

Comments

The progress of the trial so far supports combining a vaccine with standard MDT in the field. Logistically, the administration of the vaccine as immunotherapy once every 3 months to MB patients can be attained by co-ordination with the delivery of drugs by the staff of the NLEP unit. We have observed that the paramedical personnel were competent to deliver the vaccine correctly after a brief exposure and training.

The household contacts of the patients were well-motivated to accept the vaccine. Although the villagers, especially the young children, had a fear of injections, and some of the adults were apprehensive of the effect that vaccination would have on their daily work, this was overcome by informing them of the potential benefits and reassurance.

The non-medical assistants of the NLEP staff proved to be the main motivators for the vaccination, at least initially. They were the people who themselves reside in the villages and thus are trusted by the residents. Furthermore, most of the villages were deprived of the services of a doctor in the Primary Health Centre, thus the presence of doctors in our vaccinating team and the provision of free drugs for minor ailments and suitable advice for major ones went a long way to instil confidence in the villagers. This news spread by word of mouth to neighbouring villages so that when our teams visited them we were better received and the vaccination compliance increased appreciably as the trial progressed. Assistance was also extended by the village elder or the headman who also

convinced the villagers of the potential benefits of the vaccine. Gradually acquainting ourselves with the local dialect also helped.

We were able to immunize 80% of the eligible subjects in this category according to the protocol. The compliance rate would have been even higher, if the team had had the time to wait for the whole day, as some members of the family were unavailable as they had gone for work far away and others had often not returned from their fields before the team had to move on to the next village.

Acknowledgements

We wish to acknowledge all the NLEP Staff and vaccinating team members, Adner Bobbin, Krishan Pal, Parmal Singh, Mahender and Kesar Jung for their wholehearted assistance in this study, and Dr A. K. Sharma, Consultant and Head, Department of Dermatology, Venereology and Leprology, Dr RML Hospital, New Delhi and Dr R. S. Misra, Head, Department of Dermatology, Venereology and Leprology, Safdarjung Hospital New Delhi, for their invaluable help in drawing the protocol of the trials and also for their advice.

References

[1] Talwar GP. Towards development of a vaccine against leprosy. *Lepr India*, 1978; **50:** 492–7.
[2] Mustafa AS, Talwar GP. Five cultivable mycobacterial strains giving blast transformation and leucocyte migration inhibition of leucocytes analogous to *Mycobacterium leprae*. *Lepr India* 1978a; **50:** 498–508.
[3] Mustafa AS, Talwar GP. Delayed hypersensitivity skin reaction to homologous and heterologous antigens in guinea pigs immunised with *M. leprae* and four selected cultivable mycobacterial strains. *Lepr India*, 1978b; **50:** 509–19.
[4] Mustafa AS, Talwar GP. Enlargement of draining lymph nodes in mice by four selected cultivable strains of mycobacteria. *Lepr India*, 1978c; **50:** 534–8.
[5] Mustafa AS, Talwar GP. Early and late reactions in tuberculoid and lepromatous leprosy patients with lepromin from *M. leprae* and five selected cultivable mycobacteria. *Lepr India*, 1978d; **50:** 566–71.
[6] Ganju L, Mukherjee R, Batra HV, Talwar GP. Immunoblot analysis of antigens of *Mycobacterium w*: a candidate anti-leprosy vaccine using monoclonal antibodies and patient sera. *Int J Bact Micro & Hygiene*, 1990; **273:** 378.
[7] Mustafa AS. Identification of T-cell activating recombinant antigens shared among three candidate anti-leprosy vaccines, killed *M. leprae*, *M. bovis*, B.C.G. & *Mw*. *Int J Lepr*, 1988; **56:** 265–73. *Mycobacterium w*. *Lepr India*, 1981; **53:** 358–89.
[8] Saxena VK, Singh US, Singh AK. Bacteriological study of a rapidly growing strain of mycobacterium. *Lepr India*, 1978; **50:** 588–96.
[9] Katoch VM. A report on the biochemical analysis of *Mycobacterium w*. *Lepr India*, 1981; **53:** 358–89.
[10] Hance AJ, Grandchamp, Levy-Frebault V, Lecossier D, Rauzier J, Bocart D, Gicquel B. Detection and identification of mycobacteria by amplification of mycobacterial DNA. *Mol Microbiol*, 1989; **3:** 843–9.
[11] Talwar GP, Zaheer SA, Mukherjee R, Walia R, Misra RS, Sharma AK, Kar HK, Mukherjee A, Parida SK, Suresh NR, Nair SK, Pandey RM. Immunotherapeutic effects of a vaccine based on a saprophytic cultivable mycobacterium, *Mycobacterium w* in multibacillary leprosy patients. *Vaccine*, 1990a; **8:** 121–9.
[12] Zaheer SA, Suresh NR, Kar HK, Sharma AK, Mukherjee A, Mukherjee R, Talwar GP. Immunological upgrading with combined immunotherapy and chemotherapy in a lepromatous leprosy patient: a case report. *Lepr Rev*, 1991; **61:** 297–302.
[13] Mukherjee A, Zaheer SA, Sharma AK, Misra RS, Kar HK, Mukherjee R, Talwar GP. Histopathological monitoring of immunotherapeutic trial with *Mw*. *Int J Lepr*, 1992; **60:** 1, 28–35.
[14] Zaheer SA, Mukherjee R, Beena Ramkumar, Misra RS, Sharma AK, Kar HK, Kaur H, Nair S, Mukherjee A, Talwar GP. Combined multi drug and *Mycobacterium w* vaccine therapy in patients with multibacillary leprosy. *J Inf Dis*, 1993; **167:** 401–10.

[15] Ramu G, Desiken KV. A follow up study of borderline tuberculoid leprosy under sulphone monotherapy. *Ind J Lepr*, 1988; **60:** 26–33.
[16] Iyer CGS, Balakrishnan S, Ramu G. A comparison of low and conventional dosages of dapsone in the treatment of lepromatous leprosy in India. *Lepr Ind*, 1977; **49:** 372–88.

Lepr Rev (1993) **64,** 302–311

Etudes sur le terrain sur l'emploi du vaccin *Mycobacterium w* en conjonction avec un traitement médicamenteux combiné chez les lépreux, à des fins immunothérapeutiques et immunoprophylactiques

R. Walia, K. G. Sarathchandra, R. M. Pandey, S. K. Parida, S. A. Zaheer, H. K. Kar, A. Mukherjee, R. Mukherjee et G. R. Salwar

Résumé Une étude à double aveugle sur le terrain a été entreprise avec le vaccin anti-lèpre à l'étude, *Mycobacterium w* comme agent immunothérapeutique et immunoprophylactique contre la lèpre dans une région fortement endémique dont le taux de prévalence est de 18 habitants sur 1000. Au 31 août 1992, 224 villages avaient été recensés et recouvraient une population de 307.981 habitants (recensement de 1981). Un total de 979 sujets MB et de 2801 sujets PB ont été inscrits. Un total de 19,453 personnes appartenant à l'entourage domestique des sujets lépreux, ont été examinées afin de détecter des signes cliniques de la maladie. La dose initiale a été administrée à 16.519 de ces personnes et la dose de rappel de vaccin/placebo à 10.434 d'entre elles. Dans ce rapport nous soulignons les buts et les objectifs, la conception de l'étude, la situation actuelle ainsi que les facteurs socio-culturels impliqués.

Estudios de campo en el uso de vacuna *Mycobacterium w* en forma conjunta con terapia de drogas múltiples en pacientes de lepra, para fines inmunoterapéuticos e inmunoprofilácticos

R. Walia, K. G. Sarathchandra, R. M. Pandey, S. K. Parida, S. A. Zaheer, H. K. Kar, A. Mukherjee, R. Mukherjee y G. R. Salwar

Resumen Se inició un estudio de campo doble ciego con la potencial vacuna contra la lepra *Mycobacterium w* como agente inmunoterapéutico e inmunoprofiláctico contra la lepra, en una región altamente endémica con una tasa de incidencia superior a 18 por 1000 habitantes. Hasta el 31 de agosto de 1992 se evaluaron 224 aldeas con una población de 307.981 habitantes (censo de 1981). Se registró un total de 979 pacientes MB y 2801 pacientes PB. Se examinó un total de 19.453 contactos cotidianos de pacientes de lepra en busca de señales clínicas de la enfermedad, de los cuales, 16.519 recibieron la dosis inicial, mientras que 10.454 también recibieron la dosis de refuerzo de vacuna/placebo. En este artículo se detallan las metas y objetivos del ensayo, su diseño y estado actual, al igual que los aspectos socio-culturales relacionados.