RESUMOS/ABSTRACTS

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ABRAHAM, A. et. al. Assessment of testicular volume in bacilliferous leprosy: correlation with clinical parameters. *Int. J. Lepr., 62(3),* p. 310-315, 1990.

Testicular involvement in leprosy was studied in 30 multi-bacillary (BULL) patients. Ten (33.3%) gave past history of type II reactions, of whom nine (30%) gave history of testicular pain and/or swelling. Decreased libido was a common complaint (63.3%). Gynaecomastia was noted in 3 patients (10%) and altered hair pattern in 11 patients (36.7%). Testicular sensation was impaired in 10 (33.3%). Testicular volume was assessed objectively using the Prader orchidometer and found to be reduced in nine (30%) patients. Reduction in testicular volume correlated with longer duration of disease and a past history of type II reaction.

ABRAHAM, A. et. al. Acid-Fast Bacilli in Semen; Correlation with Bacterial Index. *Int. J. Lepr., 58(3),* p. 466-468, 1990.

Thirty multibacillary patients (12 LL, 18 BL) were historically reviewed and clinically assessed for evidence of testicular involvement. The bacterial index (BI) of the patients ranged from 1+ to 6+; the morphological index (MI), from 0% to 3%. Nine (30%) patients has oligospermia. while acid-fast bacilli (AFB) were demonstrable in the semen of 3 (10%) patients (2 LL, 1 BL). There was a significant correlation between the BI and the demonstration of AFB in semen ($p < 0.01$).

AGARWAL, U.S. et. al. Hypopigmented lesions in early leprosy - a clinical and histological study. *Int. J. Lepr., 62(4),* p. 416-421,1990.

26 Patients of leprosy presenting with hypopigmented lesions were divided on morphological grounds into 3 Sub groups, Group I (9 patients) with well-defined single patch with moderate to complete sensory loss; Group II (8 patients) with single Ill-defined lesion having partial sensory loss; and Group III (9 patients) having multiple hypo-pigmented patches with mild to moderate sensory loss. Epidermal atrophy was a conspicuos histological finding in all groups. Only patients in Group I showed epitheloid cells in dermal infiltrate with erosion of epidermis in one case. This group may be labelled as maculoanesthetic leprosy. Patients in Group II and Ill showed mononuclear cell infiltrate in dermis, around neurovascular bundles and appendages. They were histologically consistant with indeterminate leprosy. Follow-up biopsy after six to eight months of treatment showed healing of the lesion of reduction in the infiltrate in most cases.

BERHE, D. et. al. Epidemiological pattern of leprosy in Ethiopia: a review of the control programmes. *Leprosy Review, 61(3),* p. 258-266. 1990.

Leprosy control started in a limited area of Ethiopia in 1956. Extended coverage of the country was achieved in the early seventies. Review of the data from the control projects since 1976 revealed that leprosy is a disease of the Ethiopian highlands where prevalence rates as high as 7 per thousand have been recorded in some provinces, while the cumulative national average for the last 13 years was 2-6 per thousand. The paucibacillary form was predominant. However, unlike other African countries, a relatively high proportion of multibacillary leprosy was found in Ethiopia. The male-to-female ratio was 2:1 with the highest prevalence in the 1544 years age bracket. Detection rates for new cases have shown a gradual decline since 1982, a year before multiple drug therapy (MDT) was introduced into the country. For the last 5 years the number of new case has stabilized at 4700/year. These trends probably reflect a general reduction in the prevalence of leprosy in the country, while the conspicuous decline in 1982 is most likely related to discharge of cases during screening before MDT. The new villagization policy of Ethiopia with its effective reorganization of the populations is believed to make control programmes and supervision of MDT easier and presumably more effective. Similarly, more reliable prevalence and incidence studies could be undertaken with success.

BHATIA, V.N. et. al. Sub-clinical infection with *Mycobacterium leprae* in household contacts of leprosy. *Ind. J. Lepr., 62(3),* p. 296-304, 1990.

870 household contacts of leprosy patients were examined for sub-clinical infection with *M. Leprae* bysmear(skin and nasal), lepromin and FLA-ABS tests. 0.6%, 3.3%, 71.5% and 14.4% of the contacts were found to be positive for skin smear, nasal smear, lepromin and FLA-ABS tests respectively. An analysis of the results revealed that 4% of the lepromin positive contacts and 3.6% of the lepromin negative contacts were positive to booth FLA-ABS and skin or nasal smear.

BRANDT, F. et. al. The pathology of the eye in armadillos experimentally infected with *Mycobacterium leprae. Leprosy Review, 61(2),* p. 112-131, 1990.

One hundred and twenty-seven from 66 *Mycobacterium leprae* inoculated armadillos were studied histologically and some ultrastructurally.

Inflammatory reactions were found in the following extraocular tissues: the eyelid, including the orbicularis muscle and the third eyelid, extraocular muscles, tear gland and Harder's gland.

The early and slight changes of the intraocular tissues, small amounts of lymphocytes, plasma cells and macrophage infiltrations were confined to the area around the anterior angle specifically within the trabeculae and the adjacent ciliary body, the root of the iris and the limbus region of the cornea.

But in the cases with severe lesions the whole uvea was densely infiltrated with large, foamy macrophages intermingled with small amounts of lymphocytes, plasma cells and frequently, neutrophils. No specific necrosis of the granulomas was seen. No explanation for the neutrophil infiltrations was given.

The lesions in the cornea were significantly less severe than those in the uvea. Retinal lesions comprised of macrophage infiltrations were all obvious extensions of the adjacent uvea lesions. Acid-fast bacilla (AFB) were found within all tissues. The infection of the intraocular tissues in the armadillo eyes seemed to be mainly, if not solely, haematogenous.

BRIGHTMER, M.I. New cases of leprosy in the Cross River Region, Nigeria. *Leprosy Review, 61(3),* p. 273-281, 1990.

Rates of leprosy cases newly reporting during 1986 are examines for a region of south-eastern Nigeria. Figures reveal that in the part of

the region which was designated in 1987 as a new state, half of the administrative units had new case reporting rates higher than in adjacent areas, while the other half had very few cases reporting in 1986. Possible explanations are offered and the implications of the pattern for leprosy control in the new state are examined.

CREE, I.A. et. al. A Quantitative Study of the Relationship Between Systemic and Histological Parameters of Immunity in Individual Leprosy Patients. *Int. J. Lepr., 58(2),* p. 347-352, 1990.

A group of 52 untreated leprosy patients were examined to determine the relationship between local and systemic immunological parameters across the clinico-pathological spectrum. The Ridley-Jopling classification, bacterial index (BI), and granuloma fraction (GF) were assessed in biopsies from 40 cases. The densities of apoptoses, mitoses, and plasma cells were also measured. Systemic immunity to mycobacteria was assessed by skin tests with leprosin A and PPD, and by measurement of the serum antibody responses to *Mycobacterium leprae, M. tuberculosis,* and *M. scrofulaceum.* The serum responses to phenolic glycolipid-I (PGL-I) of *M. leprae* was assessed using a glycoconjugate which mimics an immunodominant epitope.

The serum antibody levels and skin test results showed the expected inverse relationship. The BI within lesions showed an inverse correlation with the skin test results, but none of the other histological parameters studied showed a significant relationship with the other measurements of systemic Immunity. Our findings suggest that the inverse relationship between delayed type hypersensitivity and humoral immunity in leprosy patients, which is strong in groups of patients across the leprosy spectrum, is less strong in individual patients than is often thought. The lack of correlation of many histological and systemic parameters suggests that local factors modulate systemic immunity in the pathogenesis of leprosy lesions.

DESAI, R.G. An unusual Case of Hansen's Disease (Lepromatous Leprosy) with Circulating Anticoagulant and Macroglobulinemia. *Int J. Lepr. 58(3),* p. 462-465, 1990.

A 42-year-old Mexican migrant laborer with a previous history of neurofibromatosis presented with a stuffy nose and chronic ulceration of his soft palate. Multiple subcutaneous nodules were found on his skin, and laboratory investigation revealed an elevated activated partial thromboplastin time (APTT). Further laboratory evaluation showed a lupus-like circulating anticoagulant deemed IgM by quantitative immunoglobulin studies. Although coagulation defects in lepromatous leprosy are rare, the preoperative preparation of a patient with leprosy may require a screening prothrombin time (PT), APTT and platelet count. Abnormalities in theses values may Indicate the need for specific factor assays and a search for circulating anticoagulant.

ESQUENAZI, D.A. et al. Effect of tretment on immune responsiveness in lepromatous patients. *Leprosy Review, 61(3),* p. 251-257, 1990.

This study was perfomed in order to analyse whether the immune unresponsiveness to *Mycobacterium leprae,* largely seen in lepromatous patients, persisted after discharge from treatment. Lymphoproliferation and skin tests were performed using two mycobacterial antigens *(M .Leprae* and BCG) in three groups of lepromatous patients grouped by treatment status. Forty-seven per cent of the lepromatous patients tested acquired reactivity to *M. leprae* after long-term treatment.

FURUTA, M. et. al. Leprosy and Malignancy: Autopsy Findings of 252 Leprosy Patients. *Int. J. Lepr., 58(4),* p. 697-703, 1990.

The occurence of malignant tumors in leprosy patients was studied in 252 autopsied cases. Malignant tumors were found in 33 out of 110 autopsy cases from 1962 to 1971, and in 51 out of 141 autopsy cases from 1977 to 1989 (until

July). In 1974, a lepromatous case with Kaposi's sarcoma was autopsied. The incidence of malignant tumors in our 252 cases were 33.7% (85 out of 252). Carcinoma of the alimentary system was most common: stomach, liver and large intestine, in that order. There was an increased number of hepatocellular carcinoma closely related to liver cirrhosis. Carcinoma of the lung has increased remarkably in leprosy patients quite recently. Malignant lymphoma was the most common of the nonepithelial malignant tumors, and four of these cases were seen in lepromatous leprosy patients. Eight cases showed double or triple cancers; seven of these were autopsied during 1977 to 1989.

Further studies should be done to ascertain which types of leprosy showed the highest incidence, and which sex showed more frequent malignant tumors.

GARG, S.P. et. al. Conjunctival Microbial Flora in Leprosy. *Int. J.* **Lepr.(Falta número da revista),** p. 39-44, 1990.

Conjunctival sacs of Seventy-one leprosy patients, paramedical and medical personnel working in a Leprosy Home were cultured. None of these eyes had any pathology of the outer eye. Suprisingly, 46.2% of the culturally positive eyes, carried accepted pathogens, *Staphylococcus aureus* being the commonest. Determining the preoperative bacterial flora and their elimination before undertaking intraocular surgery is recommended.

GEORGE, K. et. ai. The role of intrahousehold contact in the transmission of leprosy. *Leprosy Review 61(1),* p. 60-63, 1990.

This study examines the role of intrahousehold contact in the transmission of leprosy using the case control methodology. The study was done in the leprosy control area of the Community Health and Development (CHAD) Programme of the Christian Medical College. Three age, sex and village matched controls were selected for each case. This study shows that persons with intrahousehold contact with leprosy have a higher risk of acquiring leprosy compared with those who did not (RR 2.509; 95% confidence limits 1.23 5.109).

GILL, H.K. et. al. *Mycobacterium leprae* reactive T cell clones from lepromatous leprosy patients after prolonged dapsone chemotherapy. *Leprosy Review, 61(1),* p. 25-31, 1990.

The proliferative responses of peripheral blood mononuclear cells (PBMC) to *Mycobacterium leprae* and BCG were studied in two groups of leprosy patients: a group of 8 lepromatous patients who had been on treatment for more than 20 years (TLL) and a group of 8 untreated lepromatous leprosy patients (ULL). The mean response to M. *leprae* of the TLL group was 6195 cpm with 5 of the 8 patients responding positively. The mean response to *M. leprae* of the ULL group was 617 cpm, with only 1 patient showing a positive response. The corresponding proliferative responses to BCG were 19,908 cpm in the TLL group and 7908 in the ULL group.

Thirteen *M. Leprae* reactive clones were established from 2 TLL patients and 5 *M. leprae* reactive clones were established from 2 tuberculoid leprosy patients. Seven of these clones, 4 from the TLL patients and 3 from the tuberculoid (TT) patients could be studied further. Three of the TLL clones responded specifically to *M leprae,* while one of the clones exhibited a broad cross-reactivity to other mycobacteria. All of these clones were of the CD4+CD8 - plenotype.

Our findings suggest that responsiveness to M. *leprae* can be detected in vitro in a proportion of LL patients who have undergone prolonged chemotherapy, and that this response involves *M. leprae* reactive CD8+CD8-T cells, of wich some appear to be specific to *M. leprae.*

GIRDHAR, A. et. al. Histoid lesion in nerve of a lepromatous patients. *Leprosy Review, 61(3),* p. 237-241, 1990.

This report pertains to a patient who had

untreated diffuse lepromatous disease of 8 - to 10 - years'duration. Two peripheral nerves were beaded, wich on biopsy showed histoid features. Because of its rarity, the case is reported.

GONZALEZ-ABREU, E. et. al. Serodiagnosis of leprosy in patients'contacts by enzyme-linked immunosorbent assay. *Leprosy Review, 61(2),* p. 145-150, 1990.

Serum samples from 3336 contacts of leprosy patients were tested for antiphenolic glycolipid I antibodies by enzime-linked immunosorbent assay with the albumin coupled synthetic disaccharide antigen. The overall positivity rate was 9.3%. No significant differences were seen between a group of household contacts of lepromatous patients and those of the other types of the disease. The proportion of ELISA positives was slightly higher in the relatives as compared to workplace contacts and neighbours but significantly different only between the two former ($p<0.05$). Among those contacts with absorbance values higher than 0.100, 5 new leprosy patients were diagnosed, 2 of them with positive skin smears. A sixth contact was detected with a very high absorbance value In whom no single skin lesion was found but whose lepromin reaction was 0 mm and the skin smear showed a bacteriological index of 3+.

GROENENE, G. et al. A Longitudinal Study of the Incidence of Leprosy in a Hyperendemic Area in Zaire, with Special Reference to PGL-Antibody Results. *Int. J. Lepr., 58(4),* p. 641-650, 1990.

Between 1984 and 1988 yearly surveys for leprosy were done among the 1500 people living in a previous leprosy segregation village in Zaire. In 1984 lepromin tests and phenolic glycolipid (PGL) antibody tests were done in a significant part of the population. The prevalence of the disease at that time was 16.1%, the proportion of multibacillary cases was 11.3% overall and 22% among active cases. Prior to 1984, 23% of paucibacillary cases and 56% of multibacillary cases had presented themselves spontaneously to the Leprosy Service. The exposure to the infection is uniform, but there is a suggestion of family clustering of cases. In spite of a rapidly bactericidal treatment of all known cases in 1984 and thereafter, the annual incidence of 0.34% did not decrease during the 4 years of the study. The PGL antibody test did not contribute to the diagnosis, classification or prognosis of the disease.

GUPTE, M.D. at al. Experiences with *Mycobacterium leprae* soluble antigens in a leprosy endemic population. *Leprosy Review, 61(2),* p. 132-144, 1990.

Rees and Convit antigens prepared from armadillo-derived *Mycobacterium leprae* were used for skin testing in two leprosy endemic villages to understand their use in the epidemiology of leprosy. In all, 2602 individuals comprising 202 patients with leprosy detected in a prevalence survey, 476 household contacts and 1924 persons residing in non-case households were tested with two antigens. There was a strong and positive correlation ($r=0.85$) between reactions to the Rees and Convit antigens. The distribution of reactions was bimodal and considering reactions of 12 mm or more as 'positive', the positivity rate steeply increased with the increase in age. However, the distributions of reactions to these antigens In patients with leprosy, their household contacts and persons living in non-case households were very similar.

These results indicate that Rees and Convit antigens are not useful in the identification of M. *leprae* infection or in the confirmation of leprosy diagnosis in a leprosy endemic population with a high prevalence of nonspecific sensitivity.

GUPTE, M.D. et. al. Inter-observer agreement and clinical diagnosis of leprosy for prophylaxis studies. *Ind. J. Lepr., 62(3),* p. 281-295, 1990.

Clinical diagnosis is still the most useful tool for detecting early cases of leprosy in field

research. In prophylaxis studies accuracy of clinical diagnosis of leprosy is important during intake as well as for measuring efficacy of the intervention. This paper reports our observations regarding the extent of inter-observer variations in clinical diagnosis of leprosy and Its implications for a prophylaxis study. Information on 225 suspects and cases of leprosy, each examined independently by three senior workers after initial standardization, was used for this purpose. Agreement among the examiners regarding the presence of skin patch, thickened nerve trunk and sensory deficit was fairly high (Kappa=0.7). Agreement on the presence of infiltration in a skin patch was not satisfactory (Kappa=0.4- 0.5). It was observed that in clinical diagnosis of leprosy, presence of skin patch and sensory deficit, as well as thickened nerve trunk and related anaesthesia were correlated observations. The influence of inter-observer variations on defining leprosy problem in the community can be quite large. The paper suggests some ways of overcoming the problem.

HEYING, W. et. al. Preliminary observations on experimental leprosy in tupaias (Tupaia belangeriyunalis). Lepr. Rev., *61(1),* p.1218, 1990.

The *Tupaia beiangeri yunalls* (tree shrew) is one of the primitive primates. They were inoculated subcutaneously in the footpad or intravenously with Mycobacterium leprae from a patient with multibacillary leprosy. As controls, the foot- pads of CFW mice were inoculated with the same suspension of M. leprae. The results showed growth of acid-fast bacilli (AFB) in the footpads of locally inoculated CFW mice and in the footpads of booth locally and intravenously inoculated tupaias. Whereas the numbers of AFB declined in the footpads fo CFW mice after 12 months, they increased in the tupaia footpads, up to $2.44x10^9$ AFB/g of tissue. The footpads of one tupaia were swollen, which on section revealed a granulomatous infiltration, including foamy and heavily infected macrophages. M. leprae were also seen in the branches of cutaneous nerves. Also AFB occurred in some viscera. Preliminary studies indicate that the AFB multiplying in tupaias are *M. leprae.*

HIRATA, T. Low-magnification electron micrografy of leproma in human skin based on semithin and ultrathin sectioning. *Leprosy Review, 61(3),* p. 227-236, 1990.

Low-magnification electron micrography of leprosy lesions is described. The various cell types in the lesions, the relationships to leprosy bacilli and the distribution of bacilli in the lesions of lepromatous leprosy, are neatly demonstrated in the low-magnified pictures.

IBRAHIM, M.A. et. al. Leprosy in Saudi Arabia, 1986-89. *Leprosy Review, 61(4),* p. 379-385, 1990.

This study on leprosy includes information obtained from the Ibn Sina Hospital, a specialized centre established 27 years ago for treatment and management of the disease in Saudi Arabia. A total of 792 patients with leprosy were reported during the period of the study (1986-89). A steady decline was observed in the number of patients reported: 432(54.55%) were non-Saudi and 360 (45.45%) were Saudi. Patients were reported from a total of 22 different countries. The majority of the non-Saudi patients were from the Yemen, 286 (36.11%). The male-to-female ratio was 3.83: 1. The age groups comprised: 133(16.79%), 51 to 80; 575(72.60%), 21 to 50; and 84 (10.61%), under20 years of age. The disease was classified into five categories (Ridley and Jopling classification): 295(37.25%), lepromatous type, 238 (30.05%), tuberculoid type; 146 (18.43%), bordeline-tuberculoid type; 29 (3.66%), bordeline type; and 84 (10-61%), bordeline-lepromatous type.

Although the number of registered patients is decreasing, this trend does not suggest an overall decline in the disease in the country. It is recommended, therefore, that the services being provided to patients with leprosy must be integrated with the nationwide network of the Primary Health Care Centres to implement effective control and prevention, including health edu-

cation for the general population. Furthermore, mutual agreements must be developed with adjacent countries to study the geographic distribution of the disease.

IRGENS, L.M. et. al. Leprosy in Portugal 1946-80: epidemiologic patterns observed during declining incidence rates. *Leprosy Review, 61(1),* p. 32-49, 1990.

Compulsory notification of leprosy in Portugal formed the basis for the establishment of a national patient registry used in an epidemiological study. Highest incidence rates were observed in the coastal counties in the middle of Portugal and particularly in the municipalities with a high annual rainfall. Peak incidence rate in male was observed at the age of 25-29 years against 50-59 in females. A continuous and increasing decline in incidence rates was observed throughout the observation period, 1946-80. Towards the end of the period the slopes of the incidence curves seemed to be identical with those observed in other countries where leprosy has previously been eradicated. This is consistent with the notion that towards the end of an endemic situation no new transmission of the disease occurs, and the incidence curve takes the shape of the right part of the distribution of incubation periods which apparently is uniform in leprosy, irrespective of time and place. The pattern observed in other areas during declining incidence rates, of an increase in age at onset by year of onset together. Portuguese data, also consistent with a break in the transmission of the disease a long time before the final termination of the endemic situation.

KARTIKEYAN, S. et. aI. The sociocultural dimension in leprosy vaccine trials. *Leprosy Review, 61(1),* p. 50-59, 1990.

This paper briefly describes organizational, operational, and sociocultural aspects of the phase-III clinical trials of the ICRC anti-leprosy vaccine in Maharashtra, India. Our experience is that vaccine trials can be launched quickly and more cost effectively by using the services of health personnel from the existing public health infrastructure. That is why the trials could be launched in just 4 months after receiving the financial grant from the Indian Council of Medical Research, New Delhi (India). At the community level, a person-to-person approach in Health Education scores over audio-visual aids and the mass media. The compliance in target groups is increased when preventive programmes are backed-up by curative services and when their privacy and daily routine are not disturbed.

KLENERMAN, P. et. aI. Vibration sense and tarsal Disintegration. *Ind. J. Lepr., 62(4),* p. 422-428, 1990.

The extent of loss of vibration and pressure sensations was assessed in 21 leprosy patients with disintegration of the tarsus. Feet which had and did not have tarsal desintegration both showed severe impairment of pressure sensation, but the loss of vibration sense was more severe in feet wich had undergone the destructive process. It appears that loss of deep sensation is an important factor in the process of tarsal disintegration in feet wich are already anaesthetic. Measurement of vibration sense using a biothesiometer may be avaluable clinical test in investigation and follow-up of the patient with the insensitive foot to identify those at risk of developing tarsal disintegration.

LAMBA, P.A. & ROHATGI, J. Leprotic Keratopathy in India. Ind. J. Lepr., 62(2), p. 186-192, 1990.

Comeal affections cause severe ocular morbidity in leprosy. Poor nutrition and low socioeconomic status make the eyes prone to repeated secondary Infections which makes the pattern of corneal disease in this country different from that reported in western literature. A study of 250 patients shows that leprotic keratopathy has 4 different patterns. Primary leprous keratitis was seen in 56,5% of cases, while secondary leprous keratitis (groups B, C & ID) constituted 57.7%. In

the latter group the ocular morbidity could be prevented by controlling infection and prevention of concomitant diseases. Cases of lepromatous leprosy showed a consistently higher incidence of different types of corneal involvement than tuberculoid cases.

LEWALLEN, S. et. al. Intraocular Pressure and Iris Denervation in Hansen's Disease. In*t. J. Lepr., 58(1),* p. 39-43, 1990.

We retrospectively analyzed 255 Hansen's disease patients and found low intraocular pressure (< 7 mm Hg) in 12% of them. We showed a correlation between low intraocular pressure and avascular keratitis and iritis. We also found that patients with low intraocular pressures had abnormally large postural changes in intraocular pressure. We speculate that abnormalities in the autonomic innervation of the anterior segment of the eye may be related to the intraocular pressure abnormalities. Further investigations along this line may be increase our understanding not only of the pathophysiology of Hansen's disease but also of the mechanisms regulating homeostasis of intraocular pressure.

MALATY, R. et. al. Ocular Leprosy in Nine-banded Armadillos Following Intrastromal Inoculation. *Int. J. Lepr. 58(3),* p.554-559, 1990.

Leprosy shows a higher percentage of ocular involvement than any other systemic infection. In humans, the cornea is the first ocular tissue affected. Our previous studies in armadillos with naturally acquired and experimental disseminated leprosy showed that 44% had corneal infection. Mycobacterium leprae is found in armadillo burrows in Lousiana, U.S.A., and ocular abrasions may be the portal of entry for these organisms in wild armadillos. To test the cornea as a route of infection, we injected eight armadillos intrastromally with 2 x 10^6 M. Leprae in 1 ul. Two and 4 months later, the armadillos were sacrificed and their eyes processed for light-and electron-microscopy. After 2 months, M. leprae were found in histiocytes mainly in the corneal limbus, sclera and bulbar conjunctiva. At4 months, however, there was a visible corneal leproma in one animal. Microscopically, it was found to be a histiocytic granuloma with heavy M. leprae invasion. In addition, cells were seen in the anterior chamber. Leprosy is endemic in regions where other corneal infections which compromise the epithelial barrier property are prevalent and where leprosy bacilli are found in the enviroment. The entry of leprosy bacilli into the cornea may produce lesions which spread posteriorly in the eye.

PAVITHRAN, K. Non-pruritic eczemas as presenting manifestation of leprosy. *Ind.J. Lepr., 62(2),* p. 202-207. 1990.

Three patients who presented with eczemas as manifestation of leprosy are described. One of them having lepromatous leprosy had extensive areas of acquired ichthyosis. He developed asteatotic eczema on the legs. The pathophysiologic mechanisms for the development of ichthyosis and asteatotic eczema in this patient are briefly discussed. The second patient, with tuberculoid leprosy, presented with allergic contact eczema due to neomycin which he had applied over the plaque for scaling and crusting. The third patient, also with tuberculoid leprosy, presented with features of nummular eczema. Dryness of the skin that resulted from leprosy had led to the development of nummular eczema in this case. One peculiarity noted in all these eczemas was that they were non-pruritic.

PONNIGHAUS, I.M. et. al. Disabilities in leprosy patients ascertained in a total population survey in Karonga District, Northern Malawi. *Leprosy Review, 61(4),* p. 366-374, 1990.

This paper describes the pattern of disability among 1654 leprosy patients ascertained betweeen 1973 and 1987 in Karonga District, Northern Malawi. Approximately 20% of patients identified prior to 1980 had some disability at registration, but this percentage fell to approximately 10% with the introduction of total popula-

tion surveys in the Lepra Evaluation Project, The proportion of patients with disabilities at registration increased with age, was higher among males than females, was higher among borderline and lepromatous than tuberculoid patients, and was higher for passively than for actively detected patients. The risk of developing disabilities among patients without any disabilities at registration was approximately 5 per 1000 person years, and appeared to be slightly higher after the completion of treatment than during treatment.

PONNIGHAUS, J.M. et. al., The anatomical distribution in an African population, and its implications for the pathogenesis of leprosy. *Leprosy Review, 61(3),* p. 242-250, 1990.

Data on the anatomical sites of single leprosy lesions found in 635 newly diagnosed and biopsy-confirmed leprosy patients are presented. These patients were found during total population surveys carried out bythe Lepra Evaluation Project, a prospective longitudinal study of the epidemiology of leprosy in Karonga District, Northern Malawi. There was a striking excess of single lesions on the face and the back of the arms, compared to the distribution of skin surface area, and a deficit on the legs, regardless of age. There is some evidence for a sex difference in lesion distribution among adults, with facial and arm lesions being relatively more common in females and back lesions being more common in males. The excess of lesions on the face compared to the lower limbs is similar to data from Uganda, but very unlike data from Burma and elsewhere in Asia. Overall, the distribution of lesions does not suggest a pattern reflecting entry of Mycobacterium leprae, nor does it suggest an association with anatomical distribution of the nervous or vascular system. It is argued that the distribution reflects the influence of some 'local'environmental or behavioural factors.

SAHA, K. et. al. Sexually Transmitted Diseases in Leprosy Patients in North and Northeastern India. A Futile Search for Human Immunodeficiency Virus Antibody. Mt. J. *Lepr., 58(4),* p. 660-665, 1990.

Three-hundred-eighty-four leprosy patients were clinically examined for sexually transmitted diseases (STD) in north and northeastern India, revealing a high incidence (5.2%) of STD among them. Eighteen males, one fermate, and one eunuch were found to have chancroid ulcer, gonococcal urethritis, lymphogranuloma inguinale, and primary chancre. Of these patients, only 100, selected randomly, could be screened serologicallyfor STD due to Treponema pallidum, herpes simplex (type 1 and 2), Entomoeba histolytica, hepatitis-associated virus, cytomegalovirus, Chlamydiatrachomatis and human immunodeficiency virus (HIV); 100 control sera were included for comparison. In addition, sera from another 133 normal subjects and another 176 lepromatous patients were also screened for HIV antibody. Thus, a total of 233 normal sera and 276 leprosy sera were tested for HIV antibody. Although our leprosy patients have shown significantly high incidences of clinical STD and also high seropositivity against T. pallidum, herpes-simplex viruses types 1 and 2, hepatitis-associated virus, and cytomegalovirus, the search for antibody against HIV was negative. Our clinical and serological data suggest promiscuity in our patient population. The absence of HIV antibody in this high-risk population, however, seems to be an enigma.

SAXENA, U. et. al. Multiple cutaneous nerve abscesses on a healed tuberculoid patch. *Leprosy Review, 61(2),* p. 180-182, 1990.

A case of healed tuberculoid leprosy (TT) with multiple superficial nerve abcesses involving the whole cutaneous network on the patch is reported. To the best of our knowledge multiple cutaneous nerve abcesses involving the entire subcutaneous plexus on a TT patch is a very uncommon observation.

SHAH, P.K.D. et. al. Cardiovascular Dysautonomia in patients with lepromatous leprosy. *Ind. J. Lepr.,* 62(1), p. 91-97,1990.

Autonomic functions were studied by six standard tests in 65 patients with lepromatous leprosy and 25 healthy controls. Dysautonomia was observed in 22 patients, all having the disease for more than five years. Associated peripheral neuropathy, judged clinically, was present in all, except one patient. Of the 22 dysautonomic patients, 9 each had mild or moderate dysautonomia and 4 had severe dysautonomia as per the scoring schedule devised by us. Syncope, gustatory sweating and impotence were the symptoms suggestive of dysautonomia. But not all affected patients reported these symptoms. Involvement of the sympathetic system was more frequent than that of the parasympathetic system. Statiscally significant abnormality was seen with Atropine ratio, standing 30:15 beat ratio, postural hypotension and sustained hand grip test. Sustained hand grip test was the one which consistently gave abnormal results in all the 22 dysautonomic patients.

SHWE, T. et. al. The effect of tetanus toxoid in leprosy patients. *Ind. J. Lepr*., 62(1), p. 104-108, 1990.

Since cases of lepra reaction following small pox vaccination and BCG vaccination had been reported the effect of tetanus immunisation on leprosy patients (wheter it may provoke a lepra reaction or not) was studied. Three doses of purified tetanus toxoid (one ml initially, one ml after six weeks and one ml after six months) were given to 357 leprosy patients and 60 patients living in the same environ were followed as controls. The antibody response following immunisation was followed in six lepromatous leprosy patients using toxin antitoxin neutralisation test at the Lf/1000 level In mice and in three of them the antibody titre of leprosy patients rose to satisfactory level. The number of lepra reactions in these patients was monitored for nine months (two months before vaccination, during the six months period of vaccination and one month after the last dose of vaccine). There was no significant rise in the number of patients with reaction following the vaccination.

SREEVATSA, G.N.M. et. al. Preliminary observations on myiasis in leprosy patients. *Leprosy Review, 61(4),* p. 375-378, 1990.

Out of 3350 leprosy patients attending the surgical outpatient department for various ulcerative lesions, 18 patients had typical symptoms of myiasis. Maggots were collected in 5 cases from the nose, in 3 cases from ulcers of the hand and in 10 cases from ulcers of the foot. It was possible to rear the maggots into flies in 8 out of 18 cases. The flies were identified as Sarcophaga ruficomis and Chrysomyia bezziana.

VADIEE, A.R. et. al. The evolution of antibody response in armadillos inoculated with *Mycobacterium leprae. Leprosy Review, 61(3),* p. 215-226, 1990.

Plasma from 30 armadillos *(Dasypus novemcinctus)* was collected prior to inoculation and at approximately 3-month intervals for a period of 1-3 years. These animals were inoculated intravenously with $6.1 \times 10^8 \pm 2 \times 10^8$ (x±SD) armadillo-derived *Mycobacterium leprae.* These samples were analysed for antibodies of IgM and IgG class to phenolic glycolipid (PGL-I) and to sonicated *M. leprae* components using ELISA and immunoblotting techniques, respectively. We had previously observed among a group of 11 armadillos, that some animals produced and maintained a high IgG antibody response to PGL-I. In this study, an animal's ability to produce and maintain an elevated IgG anti-PGL-I response was significantly correlated with their ability to delay dissemination of the infection and their ability to survive longer. When the animals were moribund, a significant decrease in the IgG anti PGL-I absorbance value was observed. The detection of PGL-I in the plasma samples collected from moribund armadillos suggested that high concentrations of PGL-I in the plasma may have contributed to a drop in absorbance values by the

formation of non-lattice-type immune complexes in vivo.

As detected by immunoblotting, the IgM and IgG response to antigens derived from sonically disrupted M. leprae was directed towards molecules with broad bands of immunoreactivity ranging from 21 - to 45 - kDa. There were no distinguishing features of these antibody responses among armadillos as was evident with the IgG anti-PGL-I responses.

WARNDORFF, D.K. & WARNDORFF, J.A. Leprosy control in Zimbabwe: from a vertical to a horizontal programme. *Leprosy Review, 61(2),* p. 183-187, 1990.

In Zimbabwe leprosy control services were re-established in 1983, following the war of independence. Its main objectives were the nation-wide implementation of multiple drug treatment (MDT) and the integration of leprosy control into the general health services.

The MDT regimens have led to a rapid reduction of the prevalence of leprosy. At the beginning of 1989, 357 patients were on treatment and 1299 under follow-up. Six hundred and twenty-seven new cases have detected since 1984, wich represents an annual case detection rate of 1-6 per 100.000. This seems a fair reflection of the incidence rate, as the new cases are characterized by a minority of patients under the age of 15 (4%) and a lepromatous percentage of 50%.

As the budgest of the programme has remained unchanged integration of leprosy control into the general health services has become imperative. However, this transition is now hindered by a number of obstacles that were not foreseen at the start of the programme, because they are in measure corollaries of the successful implementation of MDT.

Most of the problems that leprosy control is facing in Zimbabwe could have been avoided if instruction in leprosy had been introduced into the curricula of the (para) medical training schools 20 years ago.

WATERS, M.F.R. et. al. Positive Mitsuda lepromin reactions in long-term treated lepromatous leprosy. *Leprosy Review, 61(4),* p. 347-352, 1990.

Twenty-four lepromatous (LL) patients, treated for 22 to 40 years with chemotherapy, including sulphones and with multidrug therapy, were tested with standard Wade Mitsuda lepromin. Thirteen gave weak positive (3-4 mm) Mitsuda reactions, confirmed histologically in the ten whose reactions were biopsied. Six of the eleven negative reactors were partly accounted for by a history of relapse, and two others had probably taken dapsone irregularly. Eleven control LL patients, treated for less than 20 years, were uniformly lepromin negative. Spontaneous lepromin conversion appears to occur around 24 years after commencing successful chemotherapy. The late Mitsuda conversions are attributed to delayed clearance of the reservoir of bacterial antigen, but apoorcorrelation between Mitsuda and Fernandez positivity is not explained.

WATERS, M.F.R. & RIDLEY, D.S. Tuberculoid relapse in lepromatous leprosy. *Leprosy Review, 61(4),* p. 353-365, 1990.

It is commonly accepted that the attainment of bacteriological negativity fails to restore the imune state of leprosy patients who have downgraded to lepromatous. We report six patients who had been lepromatous (LLs), and who, after many years of chemotherapy and bacteriological negativity, were found upon relapse to have upgraded to bordeline-tuberculoid (BT). Five had become Mitsuda lepromin positive. The relapses could be accounted for by proven or suspected dapsone resitance. The upgrading was associated with minimal signs of reaction, wich was attributed to the low level of antigen in the almost resolved lesions. The manner of development of the new high immune lesions resembled the onset of a primary infection, clinically and histologically. The development of a positive Mitsuda reaction in longstanding 1.1. leprosy is not necessarily an indication of cure.

ABBOT, N.C., et. al. Impairment of Fingertip Vasomotor Reflexes in Leprosy Patients and Apparently Healthy Contacts. *Int J. Lepr.,* 59(4), p. 537-547, 1991.

Fingertip blood-flow velocity and its control by vasomotor reflexes were studied in leprosy patients and in healthy controls with alaser Doppler flowmeter. In newly registered patients, the flow was significantly lower than in the healthy controls, and even lower values were recorded in the longstanding patients with lower limb ulcers and/ or deformity. The newly registered patients showed substantially impaired vasomotor reflex responses in the fingertips to cold challenge of the opposite hand or deep inspiratory gasp. Low blood flow and impairment of vasomotor reflexes were more prominent in those leprosy patients who showed clinical evidence of neuropathy and/or histological evidence of reaction in a punch biopsy of leprosy skin lesions. This aspect of dysautonomia to cold challenge was particularly prominent in apparently healthy, fullytreated ex-patients. There was an unexpectedly high prevalence of impairment of vasomotor reflexes in newly registered and apparently healthy, adequately treated leprosy patients. The method is very sensitive, and it remains to be established whether the lesions it detects are nonprogressive residues, or previous nerve damage, or an indication of on-going nerve damage. A minority of leprosy contacts showed impairment of vasomotor reflexes. Those with two or more affected fingers were more likely to have had a higher level of exposure to Mycobacterium leprae than those with one or no affected fingers. The cause of this unexpected impairment of fingertip vasomotor reflexes in a minority of leprosy control workes has not yet been determined.

ANNICHINO-BIZZACCHI, J.M. & MACHADO, T. F.G.S. Leprosy and acquired factor VIII inhibitor a case report. *Leprosy Review, 62(2),* p. 155-157, 1991.

In this report we describe a case of factor VIII inhibitor appearing in a man with leprosy, with comments on the clinical presentation of the disease, laboratory findings and outcome of the patient.

BHATIA, V.N. Observations on nerve tissue infected with *M. Leprae. Ind. J. Lepr., 62(4),* p. 492-494, 1990.

Nerve tissue from leprosy patients showed (i) small linear pinkish translucen crystalloid bodies, (ii) small round structures in relation to filamentous strands (iii) short pieces of filaments with round spaces within them and (iv) miscellaneous structures like pink granules, brown bodies and dark masses. These structure are being studied for their relationship to leprosy.

DANDAPAT, M.C. et. al. Treatment of leprous neuritis by neurolysis combined with perineural corticosteroid injection. *Leprosy Review, 62(1),* p. 27-34, 1991.

A study on leprous neuritis, involving the ulnar nerve, was carried out on 39 patients. The evaluation of nerve function was done before and after treatment by a score chart. Patients were divided into two groups. Group A (21 patients) was subjected to neurolysis only, and group B (18 patients) were given the combined treatment of neurolysis and perineural corticosteroid injection at the same time as neurolysis and subsequently at the end of the second and third weeks. In group B, 83.3% of patients showed 10% or more increase in the post-treatment score in comparison with 57.1% in group A. Improvement was more marked in paucibacillary cases and when the duration of nerve involvement was less than 3 months. Patients with short segments of nerve involvement with minimal thickening had better recovery. This procedure was observed to be simple, easy and well accepted by the patients, with a marked beneficial effect.

FANDINHO, F.C.O. et. al. Mycobacterial Flora of the Skin in Leprosy. *Int. J. Lepr., 59(4),* p. 569-575,1991.

The presence of mycobacteria on the

skin of healthy people and in leprosy lesions has been documented previously. The present study observed the mycobacterial flora on the hands (by the hand-washing method) and fingers (by the inoculated culture medium using scraped material obtained during the preparation of slit-skin smears) in 89 untreated leprosy patients. We also evaluated the slit-skin smears from fingers for the diagnosis of leprosy. In 16 patients (17.9%) mycobacteria were cultured from scrapings and hand washings. The frequency of isolates from lepromatous (LL) leprosy cases (52.9%) was significantly higher than from tuberculoid (TT) leprosy cases (5.2%). It was observed that Mycobacterium av/um and M. scrofulaceum were the only opportunistic mycobacteria isolated from multibacillary patients, and two hypotheses are discussed to explain these findings. The slit-skin smears from f fingers were as satisfactory as smears from other sites for the diagnosis of leprosy, but they were less satisfactory for estimating the morphological index.

GUPTA, S.C. et. al. A rapid technique for detection of leprosy. *Ind. J. Lepr., 62(4),* p. 488491, 1990.

Comparison of prevalence rates of leprosy as assessed by a rapid survey technique, in which only the exposed parts of the body were examined, with that assessed by a routine total body examination in a population of about 700 showed that most cases of leprosy were detected by the former.

HOGEWEC, M. & FABER, W.R. Progression of Eye Lesions in Leprosy: Ten-year Follow-up Study in The Netherlands. *Int. J. Lepr., 59(3),* p. 392-397, 1991.

Forty-eight leprosy patients in The Netherlands were re-examined 10 years after initial examination. Forty-six of these patients had received a course of multidrug therapy (MDT),according to the WorldHealth Organization recommendation, at the time of their initial examination. Two patients had burned-out disease and had been merely under observation. Out of 40 patients, who initially did not show eye complications due to leprosy, 37 patients were essentially the same 10 years later. The eyes had changed in 3 multibacillary patients: 1 patient had developed a late type 1 reaction with facial nerve involvement and lagophthalmos; 2 patients had undergone intra-ocular surgery for cataract and acute glaucoma, respectively. Out of 8 patients with pre-existing eye involvemnt, 1 patient recovered and the lesions in 2 patients remained unaltered. One patient showed progression of pre-existing exposure keratitis. Four patients had undergone cataract extractions; all four patients were lepromatous, with a long history of disease and signs of iris involvement at the first examination. The main progressive lesions were cataracts in lepromatous patients.

HOGEWEG, M. et. al. The significance of facial patches and Type I reaction for the development of facial nerve damage in leprosy. A retrospective study among 1226 paucibacillary leprosy patients. *Leprosy Review, 62(2),* p. 143-149, 1991.

Charts of 1226 paucibacillary leprosy patients, registered between 1982 and 1987 were reviewed for recent facial nerve damage, facial patches and the presence of Type I reaction. Twenty-six (2.1%) patients with recent lagophthalmos were identified. In a great majority (85%) patients with recent lagophtalmos showed significant patches overthe malar region or around the eye, at the same side as the nerve damage together with clinical signs of Type I reaction.

This combination of significant patches in certain locations and Type I reaction seems to be a pre-condition for facial nerve damage.

The clinical implication is that a small group of patients may be identified, who are at risk of facial nerve damage. By examining these patients more carefully it will be possible to detect nerve damage early and to prevent permanent damage of the facial nerve by timely treatment with an appropriate steroid regimen.

HUSAIN, S. et. al. Nasal myiasis in leprosy. *Lepr. Rev., 62(4),* p. 389-394, 1991.

Infestation of the nose with larvae of certain files can occur in leprosy patients. This results in severe distress and agony and can cause extensive tissue damage. The predisposing factors, clinical presentation and treatment is described.

JHA, P.K. et. al. Localized bordeline lepromatous leprosy. *Leprosy Review, 62(2),* p. 212-216, 1991.

A 48-year-old soldier presented with 3 small leprosy lesions localized over the flexor area of the forearm. There was no nerve thickening and clinically the lesions looked like bordeline-tuberculoid leprosy. However, these lesions demonstrated bacteriological index (BI) of 4+ while no acid-fast bacilli (AFB) could be demonstrated from any other site of the body. A lepromin test was negative. Histologically evidence of bordeline lepromatous leprosy was conspicuous. The case was diagnosed as localized bordeline lepromatous-leprosy and treated with multidrug therapy. After 1 year of treatment, the lesions regressed, a lepromin test was positive (5 mm) and the BI from the lesions fell to 1+.

KAUR, G. at. al. A Clinical, Immunological, and Histological Study of Neuritic Leprosy Patients. *Int. J. Lepr. 59(3),* p. 385-391, 1991.

An assessment has been made of 108 neuritic leprosy patients to find out if the number of affected nerves and the clinical presentations of these patients give any indication of the underlying severity (classification) of the disease. Detailed clinical recordings, skin smears, lepromin testing with Dharmendra antigen, and a leukocyte migration inhibition test (LMIT) using sonicated Mycobacterium leprae antigens were done these patients. Nerve biopses of available affected nerves were taken in 39 patients. The results show that neuritic leprosy patients also have a spectrum.However, none of the clinical parameters, including the number and distribution of affected nerves, the immune response and the nerve histology, were found to be interrelated. Further, even though all of the patients were skin- smear negative, a significant proportion showed lepromatous histology and nearly two thirds had a moderate-to-heavy bacterial load within the nerves.

KIRAN, K.U. et. al. Treatment of recent facial nerve damage with lagophthalmos, using a semistandardidezed steroid regimen. *Leprosy Review, 62(2),* p. 150-154, 1991.

Twenty-seven patients with borderline leprosy and facial nerve damage of <_ 6 months duration (36 eyes) were treated with a semistandardized regimen of steroids (the average starting dose was 25-30 mg, duration 5-6 months) on an outpatient basis. Red and raised reactive patches were usually present in the upper malar area or around the eye(s) in patients with recent lagophthalmos.

The lid gap was measured in millimetres during gentle and strong closure. After completion of the steroid course 75% of the eyes had complete closure or only a slight gap of 5 2 mm on gentle closure.

Steroids were found to be beneficial and safe, in the dosage that we prescribed.

KOHLI, M. et. al. Does Convit vaccine (BCG + *Mycobacterium leprae)* afford protection against biochemical changes in renal brush border membrane in experimental leprosy? *Leprosy Review, 62(3),* p. 269-275, 1991.

Renal functional status in Mycobacterium leprae infected mice can be best studied by examining the enzymatic status of brush border membrane vesicles from proximal convoluted tubule. The role of vaccination in modulation of the renal status brought by the disease has been studied using this technique. The characteristic marker enzymes of renal brush border membrane - namely alkaline phosphatase, leucine aminopeptidase and y-glutamyl transpeptidase decreased significantly ($p<0.01$) in due course in M. leprae infec-

tion over a period of 9 months. The combined vaccine (BCG + M. leprae) may have a protective effect on renal abnormalities only in the initial stages of infection as indicated by a significant rise in enzymatic levels. However, no significant ($p< 0.05$) protective effect of vaccine was found in a more advanced disease state after 9 months in infected mice.

MULIYIL, J. et. al. Effect of BCG on the risk of Leprosy in an Endemic Area: A case Control Study. *Int. J. Lepr., 59(2),* p. 229-236, 1991.

The effect of BCG on the risk of leprosy was measured using a case-control design in area endemic for the disease. In this study, 397 newly diagnosed cases and 669 controls matched for age, sex and locality were selected from a defined population. Information on exposure to BCG, contact with another case of leprosy, and relevant socioeconomic variables were obtained from the subjects. Having infectious (multibacillary) and noninfectious (paucibacillary) contacts in the household increased the risk of disease 11.7 times ($p< 0.001$) and 2.7 times ($p< 0.001$), respectively. Overall, the protection offered by BCG was not significant (odds ratio = 0.8; p=0.17). However, BCG appeared to increase the risk for indeterminate leprosy (adjusted odds ratio=2.7; p=0.09) while protecting against borderline disease (adjusted odds ratio=0.39; p=0.03). It is possible that BCG causes a shift in the overall cell-mediated immune response, thus increasing the risk for milder and transient forms of leprosy while protecting against more serious forms. These findings may have important implications for the design and interpretation of vaccine trials. Namely, trials should be designed to measure the protective efficaly of vaccines.

PEREIRA, J.H. et. al. Mycobacteria in nerve trunks of long-term treated leprosy patients. *Leprosy Review, 62(2),* p. 134-142, 1991.

Mycobacteria were present in 4 out of 8 mixed peripheral nerve trunks from patients (3 BT and 1 BL) treated with DDS and/or MDT for periods ranging from 21 months to 8 years. Most of the bacilli appeared to be 'whole'. Nerve destruction with areas of granulomatous infiltration appeared more active than expected. Possible reasons for a continued presence of bacilli in treated nerves and its implications in 'relapse' are discussed.

PONNIGHAUS, J.M. et. al. HIV Infection a Risk Factor for Leprosy? *Int. J. Lepr., 59(2),* p. 221-228, 1991.

A case control study was undertaken during 1988 and 1989 within the framework of the LEPRA Evaluation Project (LEP)/Karonga Prevention Trial (KPT) in Karonga District, northern Malawi, to investigate whether HIV infection is a risk factor for clinical leprosy. Cases were newly ascertained, biopsy-confirmed, incident leprosy patients older than 14 years of age. Controls were selected from the computer data base on over 170,000 people who form the basis of LEP/KPT. They were matched for sex, age, and area of residence. HIV seropositivity rates were 1.8% (2/112) for incident leprosy cases and 2.4% (24/1011) for controls. The Mantel Haenszel odds ratio is 0.6 (95% confidence interval 0.1-3.3). Thus, no evidence for an association between HIV infection and leprosy incidence has been observed in this population. In a parallel investigation, an odds ratio of 7.4 (95% confidence interval 3.3-16.7) was found for 102 microscopy - and/or culture-confirmed, incident pulmonary tuberculosis cases in the same population during 1989, a result similar to those obtained elsewhere in Africa. Among leprosy relapses, 16.7% (2/12) were HIV positive.

RAMESH, V. et. al. Post-kala-azar dermal leishmaniasis: a case report strikingly resembling lepromatous leprosy. *Leprosy Review, 62(2),* p. 217-221, 1991.

An adult man with post-kala-azardermal leishmaniasis who had lessons, distributed in a manner strikingly similar to lepromatous leprosy

is described. He was mistakenly treated with multidrug therapy as recommended by the WHO Expert Committee on leprosy. All investigations including slit-skin smears, histopathology, culture for Leishmania donovani and an indirect fluorescent antibody test to confirm post-kala-azar dermal leishmaniasis proved futile. The diagnosis was ultimately based on the previous history of kala-azar, the absence of other disorders which were ruled out by relevant laboratory tests and the good therapeutic response to sodium antimony gluconate. The epidemiological significance of this case and the salient points to distinguish this condition from leprosy are discussed.

RICHARDUS,J.H. & SMITH, T.C. Squamous cell carcinoma in chronic ulcers in leprosy: a review of 38 consecutive cases. *Lepr. Rev., 62(4),* p. 381-388, 1991.

The histories of 38 consecutive cases of squamous cell carcinoma (SCC) arising in chronic ulcers of leprosy patients treated between 1981 and 1990 at the McKean Rehabilitation Centre, Northern Thailand were analysed retrospectively. The study included 37 individual patients; 29 males and 8 females. The average age was 60 years, the average duration of leprosy was 34 years and the average duration of ulcers was 12 years. Most patients (76%) came from leprosy settlements. Patients with borderline-tuberculoid (BT) leprosy were most commonly affected (63%), followed by lepromatous (LL) leprosy (21%) and borderline lepromatous (BL) leprosy (16%). Four patients (11%) had histories of SCC on other extremities. Metastatic spread was observed in 2 cases (5%), both instances leading to death. The commonest site of involvement of SCC was the foot, but is was seen on the knee in 1 patient and on the hand in 2 others.

The incidence rate of SCC in the group at risk (leprosy patients with disability grading 1 and 2) is calculated as being 0.79:1000 per year. SCC was seen un 1.8% of all cases admitted for ulcer care at the Centre. Treatment is by radical amputation.

SCC in chronic ulcers in leprosy patients cannot be considered rare and emphasizes the need for an active policy of disability prevention in leprosy programmes.

RAO, P.S. et. al. Is bacteriological examination by skin smear necessary in all paucibacillary leprosy patients in mass control programmes? *Lepr. Rev., 62(3),* p. 303-309, 1991.

Skin smear bacteriological examination results of 11.255 paucibacillary leprosy patients from 8 leprosy control units under the National Leprosy Eradication Programme (NLEP) in South India and the Outpatient Department (OPD) of the Central Leprosy Teaching & Research Institute (CLT&RI), Chengalpattu, between 1987 and 1989 were collected and analysed. Only 0.05% of the smears from leprosy control units and 2.49%from the OPD of CLT&RI were found to be positive. Not a single smear from indeterminate, tuberculoid and pure neuritic types of leprosy out of 8263 examined was found positive under field conditions. The relevance of carrying out routine bacteriological examination in mass leprosy control programmes is discussed.

SAXENA, Uma. et. al. Persistent reaction in paucibacillary leprosy: case reports. *Leprosy Review, 62(2),* p. 206-211, 1991.

Three patients of histopathologically confirmed borderline-tuberculoid leprosy showing no acid-fast bacilli and with lesions confined to the face, 2 on the cheek and 1 on the forehead, were given multidrug therapy as recommended by the WHO for paucibacillary cases. Within 3 months the lesions showed signs of upgrading (or reversal) reaction which was substantiated by histopathology. In 1 patient the facial nerve was affected leading to facial palsy. The lymphocyte transformation test did not show a significant rise. All 3 patients were given oral prednisolone for periods varying between 5 and 7 months, but the response was poor except in 1 patient in whom the facial palsy responded favourably. Injections of sodium antimony gluconate tried in 1 patient after stoppage of steroids did not control the reaction.

After 18 months of regularfollow-up during therapy, the cutaneous reaction in the patient with facial nerve involvement subsided leaving significant atrophy. However, in the other 2 patients the skin lesion persisted with clinical and histopathological evidence of upgrading reaction. The reasons for the unnatural persistence of reaction in these patients is not clear.

SEN, R. et. al. Patterns of erythropoeisis and anaemia in leprosy. *Leprosy Review, 62(2),* p. 158-170, 1991.

A total of 128 leprosy patients were Investigated for the morphological type of anaemia the underlying disturbances in iron metabolism and patterns of erythropoeisis and other cytomorphological changes in the bone marrow. The anaemia was a mild to moderate degree in paucibacillary (PB) leprosy, while in multibacillary (MB) leprosy it was of a severe degree. Iron deficiency was observed in only a few patients. Impaired iron utilization as observed in anaemia of a chronic disorder was a common finding in MB leprosy (41.7%) and more so in new cases (50%). Megaloblastic erythropoiesis was also more frequent in MB leprosy (45.2%) as compared to PB leprosy (16%), accounting for the severe degree of anaemia in the former type. In 17.2% of the total patients (MB, 21.4%; PB, 9%) both megaloblastic erythropoiesis and features of impaired iron utilization were observed in bone marrow. Disturbances in iron metabolism and erythropoiesis were also observed but to a lesser degree in patients receiving specific antileprosy treatment. Irrespective of the type of disease and duration of treatment, increasing frequency of acid-fast bacilli (AFB) positivity and granulomas was observed in the bone marrow with an increasing severity of anaemia.

SOEBONO, H. & KLATSER, P.R. A Seroepi-demiological Study of Leprosy in High-and Low-endemic Indonesian Villages. *Mt. J. Lepr., 59(3),* p. 416-425, 1991.

A seroepidemiological study was performed in three different leprosy-endemic areas in Indonesia, including two isolated villages with high endemicity In South Sulawesi (Kaluarang and Hub) and an area with low endemicity in Java (Jepara). A total of 2430 serum samples were collected from 2672 individuals in these locations. The prevalence of leprosy in these three areas, as determined during this study, was 29/1000, 11/1000, and 7/1000 in Kaluarang, Hub and Jepara respectively.

Two serological assays were employed In this study to detect antibodies against *Mycobacterium leprae.* One is an enzyme-linked immunosorbent assay (ELISA) based on the detection of antibodies to the species-specif ic epitope of phenolic glycolipid-I (PGL-I) of M. leprae. The second test, using inhibition of an ELISA reaction (ELISA-INH) detects antibodies to a species- specific epitope on the 36-kDa protein antigen of M. leprae. In comparison with clinical findings, the specificity of both serological tests was calculated to be 91%. The sensitivity of the ELISA was 97.6% for multibacillary (MB) cases and 56.8% for paucibacillary (PB) cases; for the ELISA-INH, it was 97.6% and 81.8% for MB and PB cases, respectively.

Seropositivity rates were shown to be unrelated to sex, to Mitsuda skin-test reactivity, or to BCG vaccination status. The pattern of Seropositivity was, however, clearly age-related, with high seropositivity in the age group 10-19 years and deceasing rates of positivity in the older age groups. Age-standardized seropositivity ratios were not correlated to the prevalence of leprosy when comparing the three areas. Therefore, it is not yet clear whether or not seropositivity reflects infection. If it does, other, as yet unidentified, factors may play a role in the natural history of the disease.

THANKAPPAN, T.P. & SULOCHANA, G. Keratosis spinulosa developing In borderline-tuberculoid lesions during type I lepra reaction: two cases reports. *Leprosy Review, 62(1),* p. 49-52, 1991.

Two cases of borderline-tuberculoid leprosy which developed keratosis spinulosa over the anaesthetic areas alone during type 1 lepra

reactions are described. Both patients only developed spiny papules during the period of reaction and subsided with control of the reaction. The probable mechanism of the peculiar phenomenon might be due to the generation of epidermal growth factors by local T cell activation during the type 1 lepra reaction.

UPLEKAR, M.W. & CASH, R.A. The private GP and leprosy: a study. *Lepr. Rev., 62(4),* p. 410-419, 1991.

In urban and rural areas alike, people in India tend to prefer private medical care to the existing government health services. Nevertheless, the large private health care sector has hitherto been virtually alienated from activities of public health importance including priority disease control programmes. This study of 106 private general practitioners (GPs), practising in low socioeconomic areas of Bombay, shows a gross lack of knowledge and awareness among private doctors about leprosy and also about the National Leprosy Control Programme. The possible reasons are discussed. Effective in involvement of GPs in the National Leprosy Control Programme should facilitate both integration and better implementation of leprosy control activities. The study also highlights some areas fo future interventions at both primary and secondary health care levels and the need for a strategy, based on larger studies, to train and make private doctors participate in controlling diseases of major public health concern like leprosy.

BIRKE, J.A. et. al. Healing rates of plantar ulcers in leprosy and diabetes. *Lepr. Rev., 63(4),* p. 365-374, 1992.

Comparison was made of wound healing time in a consecutive series of leprosy and diabetic patients with plantar ulceration. In the leprosy group, 66 of 70 (94%) ulcers healed in a mean time of 42.7 (t 36.1) days, and in the diabetic group 75 of 80 (94%) ulcers healed in a mean time of 39.7 (±32.1) days. Analysis of all healed ulcers using a general linear model found wound depth ($p<0.03$), and wound diameter ($p<0.05$) significantly related to ulcer healing time. Diagnosis, healing devices (cast, splint and cut-out sandal), age and sex were not significant. In diabetic subjects a regression model including depth, diameter and age explained 36% of the cariation in healing time. A meaningful regression model was not found in leprosy patients.

COURTRIGHT, P. & LEWALLEN, S. Considerations in the integration of eye care into leprosy care services. *Lepr. Rev., 63(1),* p. 73-77,1992.

Little attention has been directed to the development, management and evaluation of eye care programmes for leprosy patients. This paper examines when an eye care programme for leprosy patients is needed, methods for integrating eye care into leprosy control programmes and lists of available ocular leprosy teaching materials.

HAUHNAR, C.Z. et. al. A clinical and radiological study of maxillary antrum in lepromatous leprosy. *Ind. J. Lepr., 64(4),* P. 487-494, 1992.

Seventy consecutive patients having multibacillary leprosy were questioned about symptoms of nasal involvement and sinusitis. Complete otorhinolaryngeal examination was carried out in all these patients and they were subjected to radiographic examination of paranasal sinuses. Radiological abnormality of maxillary antrum was found in 40 (57%) patients. Radiological changes were unilateral in 25 and bilateral in 15 patients. Localised or generalised mucosal thickening was the most common finding, followed by diffuse opacity. The development of radiological changes in maxillary antrum correlated with high bacterial density (BI 3+and above), nasal deformity, and disease duration of more than two years.

HAUHNAR, C.Z. et. al. Maxillary Antrum Involvement in Multibacillary Leprosy: A radiologic, Sinuscopic, and Histologic Assessment. *Int. J. Lepr., 60(3),* p. 390-395, 1992.

Thirty patients having lepromatous leprosy (22 males, 8 females) and showing radiological involvement of the maxillary antrum were subjected to sinuscopy, biopsy, and histopathological examination. Radiological observations showed diffuse opacity in 33.3% of the sinuses, localized mucosal thickening in 28.6% and generalized thickened mucosa in 38.1%. Sinuscopy revealed inflamed mucosa as the most common finding (40%) followed by ulcerative (26.7%) and granulomatous (10%) lesions of the mucosal lining. The mucosal thickening (localized or generalized) evident on radiology was always associated with granuloma formation and acid-fast bacilli In the histology. The presence of an external nasal deformity indicated a statiscally significant chance of encountering mucosal Involvement on sinuscopy and histopathology ($p<0.05$). There was more chance of finding positive sinuscopic lesions in those patients with a bacterial index above 3+.

JENNEKENS, F.G.I. &JENNEKENS-SCHINKEL, A. Neurological examination of patients suffering from leprosy: Is it worthwhile? *Leprosy Review, 63(3),* p. 269-276, 1992.

We examined 28 male leprosy patients to discover if a more extensive neurological investigation than usual would be worthwhile in diagnosis and/or management. Our findings were fully compatible with what might be expected from a mononeuritis multiplex, either due to leprosy or other causes. The following observations are noteworthy. Changes of position sense and a decrease of some tendon reflexes were present in a minority of the patients. In soles of the feet, considered to be an - or hypaesthetic, some residual pain sensation could occasionally be detected. Functional testing of at least one muscle group (m. triceps surae) appeared to be more reliable than manual testing according to MRC criteria. We concluded that an extensive neurological examination is probably not required for diagnosis. It does provide, however, more accurate information on the extent of damage to the peripheral nervous system, which maybe important for management and for assessment of treatment effects. The use of a myometer is advocated.

KUMAR, V. et. al. An ultrastructural study of schwann cells in peripheral nerves of leprosy patients. *Ind. J. Lepr., 64(1),* p. 81-87, 1992.

An ultrastructural study of peripheral nerves in leprosy patients was carried out of ascertain the changes in Schwann cells containing myelinated and nonmyelinated axons. Axonal multiplication was noticed in nonmyelinated axons in specimens from both tuberculoid and lepromatous leprosy. The Schwann cells in tuberculoid nerves were devoid of M. leprae In contrast to those In lepromatous nerves in which large number of bacilli were seen. These observations suggest that the Schwann cells containing nonmyelinated axons may be affected more frequently in either type of leprosy.

LIWEN, D. et. al. Diagnostic exploration of enlarged peripheral nerves in suspected cases of leprosy. An analysis of 55 cases. *Leprosy Review, 63(2),* p. 141-144, 1992.

In 55 cases presenting with enlarged peripheral nerves without any skin lesions, a rice grain-sized biopsy of the nerve lesion was taken for histopathological examination. As a result definitive diagnoses could be established leprosy was diagnosed in 32 cases. In 23 cases the cause of nerve enlargement was not leprosy: post-traumatic neuritis 9, cysts 5, hypertrophic neuritis 3, nonspecific 4, neurofibroma 1, and amyloidosis 1. In all of these cases there was a deficit of the nerve function and postoperatively there were no complications. The authors, as a result of this experience, believe that surgical exploration and biopsy is a harmless diagnostic tool for stablishing a definitive diagnosis of leprosy in cases presenting with enlarged peripheral nerves without any skin lesions. In 23 out of 55 such cases the nerve

enlargement was proved to be other causes than leprosy.

MAFOYANE, N.A. et. al. Primary neuritic leprosy in a black South African. *Lepr. Rev., 63(3),* p. 277-281, 1992.

A case of primary neuritic leprosy in a black South African is described, in which the multiple peripheral nerves were affected. The clinical picture and eletrophysiological studies are in keeping with a picture of mononeuritis multiplex. Selective involvement of the facial nerve branches with normal blink reflex latencies was observed. The biopsy of the sural nerve disclosed features most consistent with borderline leprosy.

PALANDE, D.D. & BOWDEN, R.E.M. Early detection of damage to nerves in leprosy. *Lepr. Rev., 63(1),* p. 60-72, 1992.

Methods of examining and diagnosing damage to nerves commonly involved in leprosy are described. The equipment used is inexpensive, gives reliable and repeatable results and is useful in making objective assessments in terms of function in everyday living.

PATKI, A.H. & MEHTA, J.M. Hyperkeratotic and verrucous skin lesions on lower extremities of leprosy patients. *Ind. Lepr., 64(2),* p. 183-188, 1992.

Three morphological varieties of hyperkeratotic and verrucous skin lesions on the anterior aspect of ankle joints in patients with leprosy are described: (i) verrucous lesions with thread-like horny projections similar to filiform warts; (ii) irregular compact hyperkeratotic lesions with deep fissures in a between; and (iii) hyperkeratotic lesions with linear fissures corresponding to the transverse creases on the anterior aspect of the ankle. Chemical cautery was useful for the treatment of the first two varieties, and a potent topical corticosteroid with salicylic acid was useful for the third.

RASOULI, I. & MEHTA, L.N. Reaction of peripheral nerves to vascular and bacterial injuries. *Ind. J. Lepr., 64(1),* p. 14-27, 1992.

Mouse sciatic nerves were subjected to desvascularization, *M. leprae* inoculation, and combined insult of desvacularization + footpad inoculation (FPI). Changes were seen in FPI nerves only after eight months, but in cases of combined insult, changes were evident in hours. Both the groups showed initial loss of small myelinated fibres. No proliferation of Schwann cells was in FPI nerves, but in combined insult it was maximum after two weeks. Presence of *M. leprae* seems to be arresting Schwann cell activity after two weeks. Blood vessels showed increased endothelial cell cytoplasm, basement membrane proliferation and villi formation. These changes seem to be specific of endoneurial blood vessels of leprosy nerves. Increased number of mast cells seems to be specific of devascularized and FPI nerves, Increased number of macrophages expressed low immunity of devascularized nerves. Eosinophils migrated to endoneurium as a result of leakage of axoplasm.

SONI, N.K. Leprosy of the tongue. *Ind. J. Lepr.,* 64(3), p. 325-330, 1992.

Ten out of the twenty-five lepromatous leprosy patients studied showed clinical evidence of involvement of the tongue, and they presented with various symptoms like loss of taste, stiffness of tongue, bleeding, pain etc. Various rypes of lesions ranging from small nodule to granuloma formation, ulceration, macroglossia and fissured cracked tongue were noted. The tongue lesions were found to be related to the severity of leprosy.

TALWAR, S.; JHA, P.K.; &TIWARI, V.D. Neuritic leprosy: epidemiology and therapeutic responsiveness. *Leprosy Review, 63(3),* p. 263-268, 1992.

We studied epidemiology, progression and therapeutic responsiveness in 62 cases of neuritic leprosy. Numbness was the main presenting symptom. Mononeuritis involving the ulnar nerve, followed by the common peroneal nerve was the commonest presentation. The lepromin test was positive in 34 cases while a slit-skin smear was negative in all cases. We treated 20 of these cases with dapsone monotherapy and 5 cases (25%) developed a skin lesion after an average duration of 3 months'treatment. We treated 42 cases with a combination of dapsone and rifampicin, and 3 cases (7%) developed a skin lesion after an average duration of 2-6 months. The subsequent diagnosis in cases developing skin lesions was borderline-lepromatous in 1 case, borderline-tuberculoid in 4 cases, tuberculoid in 2 cases and indeterminate in 1 case.

VREEBURG, ANNA. Clinical observations on leprosy patients with HIV1-infection in Zambia. *Leprosy Review, 63(2),* p. 134-139, 1992.

The clinical observations carried out on 10 leprosy patients with HIV1-infection, admitted between 1.1.1986 and 1.5.1988 to the Salvation Army Hospital at Chikankata, Mazabuka, Zambia are described. A total of 8 of this group were newly-diagnosed borderline leprosy patients.

Their clinical data were compared with those of 34 newly-diagnosed borderline leprosy patients, admitted in the same period - 50% were men, 50% women.

The clinical presentation, with respect to leprosy, on admission, did not differ very much in both groups. The incidence of neuritis in both groups was 50% (respectively 5 and 17). The outcome of specific therapy of neuritis was worse in the HIV1 patients than in the order group, only partial recovery in 4 out of 5 and no response in 1, compared with a complete recovery in 10 cases, and a partial recovery in 7 cases in the other group.

A total of 6 patients of the HIV1-group admitted to have had multiple heterosexual contacts, 5 had a history of sexually transmitted disease, 7 had generalized lymphadenopathy and 4 presented with another disease in addition to leprosy.

While in hospital the group of 10 HIV1-infected patients suffered 17 episodes of intercurrent disease against none in the other group, 1 patient (male) died with generalized dermatitis and sepsis: 1 woman died with fulminant hepatitis.

HANSENÍASE EXPERIMENTAL

JOB, C.K. et. al. Early infection with *M. leprae* and antibodies to phenolic glycolipid-I in the nine banded armadillo. *Ind. J. Lepr., 62(2),* p. 193-201, 1990.

Nine-banded armadillos were intravenously infected with 109M. leprae. IgM antibodies to PGL-I were evaluated three times during the six months before and every two months after the infection. A thorough autopsy examination was done on animals that died or were sacrificed at intervals of 3, 4, 6,12,15 and 18 months after the infection. Three animals which had acquired the infection in the wild and one experimentally infect-. ed animal showed significant increases in antibody levels corresponding to their high bacterial load. In the other five experimentally infected animals, M. leprae infection was established in the cells of the reticulo endothelial system (RES) long before the IgM antibody levels to PGL-I became positive. It is possible that in human leprosy also M. leprae may enter and multiply in the RES initiating antibody production during the incubation period before clinical disease with neuritis becomes manifest.

BASKIN, G.B. et. al. Experimental Borderline Lepromatous Leprosy with Intraneural *Erythema Nodosum Leprosum* in a Mangabey Monkey *(Cercocebus atys). Int. J. Lepr. 59(4),* p. 618-623, 1991.

Asooty mangabey monkey (Cercocebus atys) was inoculated with Mycobacterium leprae and developed borderline lepromatous leprosy and intraneural erythema nodosum leprosum. Previously studied mangabeys have developed only disseminated lepromatous leprosy without reactions. This case broadens the spectrum of leprosy seen in experimentally inoculated animals and further characterizes the nonhuman primate model of leprosy.

CHACRABARTY, A.N. et. al. Mouse footpad pathogenicity of leprosy derived nocardioform bacteria cultivated in vitro. *Ind. J. Lepr., 63(1),* p. 43-60, 1991.

In vitro cultures of the nocardioform bacteria from leprosy-infected tissues consisted of granules and bacilli. Inoculation of these granules into mouse footpads (MFP) produced a mild, localised, inflammation for 4-6 weeks. The granules evoked typical granulomatous response in the subcutaneous tissue and showed gradual disintegration. Infiltration of muscles, connective tissue and epithelial cells by bacillary/mycelial masses was seen very frequently, and that of nerve bundles occasionally. Plenty of mycelial tufts emanated from many'macrophage globi'. By 6-8 months, the granules disintegrated nearly completely releasing a large number of acid-fast bacilli (AFB), single layered rings of AFB, small globi and some residual mycelia. These AFB, harvested from the MFP, were similar to or indistinguishable from the bacillary preparations from the in vitro cultures and from the leprosy bacillus obtained directly from humans or as passaged into the MFP, on the basis of many criteria studied, including the 36k gene positivity.

GORMUS, B.J. at. al. A Serologic Study of Naturally Acquired Leprosy in Chimpanzees. *Int. J. Lepr., 59(3),* p. 450-457, 1991.

Data from longitudinally obtained serum samples spanning several years has permitted us to identify two chimpanzees with leprosy and to estimate the time of Mycobacterium leprae expo-sure/infection. The results confirm high levels of specific anti-M. leprae phenolic glycolipid-I (PGLI) as well as antilipoarabinomannan (anti-LAM) antibodies in both chimpanzees, and identify additional chimpanzees with possible M. leprae exposure. The observations are consistent with the hypothesis that leprosy exists in chimpanzees in the U.S.A. and suggest the possibility that M. leprae may be transmitted among chimpanzees. The data suggest that monitoring anti-PGL-I and anti-LAM IgG and IgM levels longitudinally in leprosy contacts may be useful in the recognition of preclinical leprosy.

JOB, C.K. et. al. An attempt to produce experimental tuberculoid leprosy in the nine-banded armadillo. *Ind. J. Lepr., 63(2),* p. 159-165, 1991.

In an attempt to produce experimental tuberculoid leprosy, three nine-banded armadillos, two borderline tuberculoid lepromin reaction, and one with tuberculbid lepromin reaction, were chosen. They were injected subcutaneously in a four square centimetre area in the abdominal skin with saline suspension of $6.5x10^7$ M. leprae. Induration of skin at the injected site appeared in 24 hours and persisted for 6 months in one and for 18 months in the other two animals. Histopathological examination of the infected site at 6 weeks, 18 and 20 months showed progressively decreasing granulomatous inflammation; but the cutaneous nerves were uninvolved. Autopsy examination of the three animals failed to show disseminated disease. Since there was no evidence of nerve involvement, experimental transmission of tuberculoid leprosy to armadillos

could not be established in this study.

ROJAS-ESPINOSA, O. et. al. Inhibition of Complement Activity in Murine Leprosy. *Int..J. Lepr.,* 59(4), p. 605-612, 1991.

NIH mice Infected with *Mycobacterium lepraemurium (MLM)* show a marked depression in their levels of hemolytic complement that is proportional to the degree of infection. The defect affects more the activation of complement through the classical pathway (CPW) than the activation of complement through the alternative pathway. Although this low activity of CPW-complement may be due to different causes (complement consumption by the infecting microorganism, lack of biosynthesis of complement components, or the presence of complement inhibitory factors), our results seem to support the last possibility. The generation of factors in the infected animals that inhibit the autologous activity of complement as the infection goes on reduces the risk of complement-mediated tissue damage and prolongs the survival time of the host, a wise strategy on the part of the MLM, to assure its own survival as a parasite.

ESTRADA-G., I.C.E. et. al. Use of Synthetic Peptides Corresponding to Sequences of *Mycobacterium leprae* Proteins to Study Delayed-Type Hypersensitivity Response in Sensitized Guinea Pigs. Int.J. Lepr., 60(1), p. 18-27, 1992.

In this work we report the synthesis of 10 peptides (P1-P10) corresponding to one or several segments of the amino acid sequence of proteins from *Mycobacterium leprae:* 65 kDa, 28 kDa, 18 kDa, and 28 kDa superoxide dismutase, recently renamed antigens 2L, 9L, 12L, and 14L, respectively. They were assayed in the guinea pig model for the induction of a delayed-and BCG-sensitized animals. To sensitize the animals two schemes were used: either a single dose of 5 x 10^8 irradiated or autoclaved whole bacilli, orfour weekly intramuscular injections each containing 500 ug of soluble extract of *M. leprae* (MLSE) in incomplete Freund's adjuvant. Because the second scheme used far too much antigen, we decided to use the first scheme for the experiments we report here. DTH reactions of sensitized animals were induced after 30 days with intradermal injections of 5 g of MLSE and with each of the 10 peptides at three different concentrations: 250 g,100 g, and 0.05 g. All *M.* leprae-sensitized guinea pigs gave indurations of 10 mm or more with MLSE, which indicates that the animals were sensitized. None of them gave DTH indurations with 250 g or 100 g, but some of them had positive DTH reactions with the 0.05 ug doses of the synthetic peptides. This is most likely due to the fact that we have used an outbred strain of guinea pigs. The peptides were also tested at 0.05 ug in animals sensitized with BCG P7 and P10 seem to be nonspecific peptides; the remaining peptides only induces DTH in the *M* leprae-sensitized guinea pigs. P3 (segments 65-85 of the 65-kDa protein) induced a positive DTH in 58% of the tested animals.

In other experiments, guinea pigs were sensitized with a single injection (500g) of each of the synthetic peptides. All animals except those sensitizes with P4 and P8, had positive DTH responses when the homologous peptide was used. Those sensitized with P2, P4, P5, P7, and P8 were able to produce indurations when MLSE was used for the induction of the DTH reaction.

GANGADHARAM, P.R.J. & DHOPLE, A.M. Utility of beige mouse in leprosy research. *Ind. J. Lepr., 64(4),* p. 475-482, 1992.

Dissemination of *M. leprae* to visceral organs is seen by four months onwards only in beige (C57BU6/bg'/bgl but not BALB/c mice followin intravenous or intraperitoneal infections. Inoculation of the beige mouse derived *M. leprae*

showed all the characteristics of *M. leprae,* including growth pattern in the foot-pads of BALB/c mice. *M. leprae* inoculated into foot-pads of beige mice multiplied faster than those in the foot pads BALB/c mice. The possibility of using beige mouse in chemotherapeutic studies in leprosy is discussed.

SHETTY, V.P. et. al. Ultrastructural study of mouse dorsal root ganglion cultures infected long term with *M. leprae. Ind J. Lepr., 64(3),* p. 293-302, 1992.

Ultrastructural changes in the mouse dorsal root ganglion cultures infected long-term with viable *M. leprae* were studied. Subtle cytomorphological changes and loss of neurites noted in the long-term infected cultures were correlated early events in the nerve damage.

IMUNOLOGIA

AMEZCUA, M.E. et. al. Prospective Immunological Follow-up in Household Contacts of Mexican Leprosy Patients. *Int. J. Lepr., 58(4),* p. 651-659, 1990.

A 6-year prospective study of 79 household contacts of leprosy cases was made in order to correlate the development of the disease with their specific T-cell immunity, measured by the Mitsuda test, and levels of *anti-Mycobacterium leprae* antibodies determined in three consecutive observations with the FLA-ABS test. Overall in the contacts, 71.7% were Mitsuda positive and 93.6% showed seropositivity, without regard to their age, sex, or leprosy type of their index case. Households were divided into lower-risk and higher-risk groups according to either the paucibacillary or multibacillary character of their index case. The lower-risk group consisted of 19 contacts of 2 tuberculoid (TT) and 5 indeterminate cases. The higher-risk group was made up of 60 household contacts of 18 active lepromatous (LL) cases. All but two contacts in the former group had a positive Mitsuda reaction; the most common antibody titer was 1:160, with atendency to stabilize or decrease over time. In the two Mitsuda-negative contacts, increased antibody levels were observed. In the higher-risk group, 61.6% were Mitsuda positive and showed a humoral profile similar to those Mitsuda positive in the lower-risk group. In most of the Mitsuda-negative LL contacts, the antibody levels remained constant or progressively increased, suggesting a high probability of active subclinical infection. This assumption was partially supported by the finding of a new borderline lepromatous (BL) leprosy case in the Mitsuda-negative LL contact group. Nevertheless, the contribution of the close and extensive contact with a multibacilliferous case as a risk factor was difficult to evalute because of the small size of the sample studied.

BAGSHAWE, A.F. et. al. IgM Serum Antibodies to Phenolic Glycolipid-1 and Clinical Leprosy: Two Year's Observation in a Community with Hyperendemic Leprosy. *Int. J. Lepr., 58(1),* p. 25-30, 1990.

A village population with hyperendemic leprosy in Papua New Guinea was repeatedly examined for clinical leprosy and for serum IgM antibodies to phenolic glycolipid-I (APGL-1) over 2 years between 1984 and 1986. In 1984, serum APGL-I was elevated in 15% of the subjects without clinical leprosy, and the prevalence of seropositivity was not significantly different in subjects from households with or without leprosy. In 1986, the prevalence of elevated serum APGLI in leprosy-free subjects had risen to 23%. The incidence of seroconversion from APGL-I negative to APGL-I positive was 9.5% per year (95/ 1000 person years) in 253 subjects tested in 1984 and 1986. During the same period, 27 of 40 (67%) leprosy-free subjects reverted from positive to negative. The positive seroconversion rate in the community was higher than the incidence of clinical leprosy (11.2/1000 person years) over the same period. However, elevated serum APGL-I was not associated with clinical disease and failed to predict the development of disease over 2 years. The significance of persistent

seropositivity found in 14(5%) leprosy-free subjects is uncertain.

CARTEL, J.L et. al. Assessment of Anti-Phenolic Glycolipid-I IgM Levels Using an ELISA for Detection of *M. leprae* Infection in Populations of the South Pacific Islands. *Mt. J. Lepr, 58(3),* p. 512-517, 1990.

Anti-phenolic glycolipid-I (PGL-I) IgM levels were determined in 96% of the general population of the Southern Marquesas and Maupiti, remote islands of French Polynesia, where the average annual detection rates of leprosy during the past 30 years have been 57.1 and 4.4 per 100,000 respectively. The seropositivity in these two areas was 4.3% and 4.2%, respectively. No significant difference (p>0.05) was found between either these two figures or between the percentages of persons with high (z 0.500 OD) anti-PGLI IgM levels (9.2% and 5.3%). In the two islands, the age distributions of anti-PGL-I IgM were very similar, the percentage of positive responders was higher in females than in males and higher in adolescents than in adults. These results suggest that the usefulness of the determination of anti-PGL-I IgM levels by ELISA, using the synthetic trisaccharide as antigen, for detecting *Mycobacterium leprae* infection in leprosy control programs is extremely doubtful.

COWLEY, S.A. et. al. Major Histocompatibility Complex Class II Antigen Expression in Nerves in Leprosy; an Immunoelectron microscopical Study. *Int. J. Lepr., 58(3),* p. 560-565, 1990.

A technique for immunoelectro nmicroscopy has been used to investigate major histocompatibility class II expression in leprosy nerves. In normal nerves, endothelial cells and occasional endoneural cells (not Schwann cells) were constitutively class II positive. In both paucibacillary and multibacillary leprosy nerve biopsies, infiltrating leukocytes were positive but class II-positive Schwann cells were not seen. These observations indicate that Schwann cells may not be involved in presenting *Mycobacterium leprae* antigens to T cells in leprosy. This conflicts with evidence from in vitre studies, but may be explained by the fact that in vivo Shwann cells are surrounded by basement membranes and are closely associated with axons.

D'SOUZA, D. et. al. Effects of Lepromatous Leprosy (LL) Serum Factor(s) on Normal Blood Lymphocytes. *Mt. J. Lepr 58(4),* p. 666-673, 1990.

To investigate the clastogenic activity of sera from leprosy patients, normal peripheral blood lymphocytes were cultured in both inactived and nominactivated lepromatous leprosy (LL) sera. An increase in the frequency of chromosome aberrations was observed in normal lymphocyte cultures supplemented with both inactivated (5.2%) and nominactivated (5.0%) LL serum compared to that of cultures supplemented with normal human AB + serum (2.4%). An enhanced frequency of sister chromatid exchanges (SCEs) was also observed in normal lymphocyte cultures supplemented with both inactivated (8.2±3.85) (mean ± S.D.) and noninactivated (8.3±4.61) LL serum compared to that of controls (6.8±3.45). The normal blood lymphocyte cultures with LL serum have revealed a slow cell-cycle kinetics at a 48-hr incubation period, but a slightly faster proliferation rate was observed at 72 hr compared to cultures, supplemented with normal human AB+ serum, indicating a depressive effect of LL serum on normal blood lymphocyte proliferation. The results obtained from the inactivated LL serum showed that the factor(s) which induce chromosomal damage, depress the mitotic index and the cell proliferation rate were not destroyed at 56°C. These results are the first documentation of cytogenetic effects of LL sera on normal human peripheral blood lymphocytes.

GORMUS, B.J. et. al. Antibodies to Lipoarabinomannan Antigen in Sooty Mangabey Monkeys Experimentally Inoculated with Mycobacterium leprae. Int J. Lepr., 58(1), p. 65-72, 1990.

IgG and IgM antibody levels to mycobacterial lipoarabinomannan (LAM) antigen were determined by ELISA in eight sooty mangabey monkeys (Cercocebus atys) prior to and at intervals after experimental inoculation with Mycobacterium leprae. High levels of anti-LAM IgG were present before inoculation and increase thereafter in the five mangabeys that developed lepromatous (LL) forms of leprosy; lower levels of anti-LAM IgG were observed in two mangabeys that developed indeterminate leprosy and tuberculoid/neuritic leprosy, respectively, and in a mangabey, that was leprosy resistant. IgM anti-LAM levels were near zero before M. leprae inoculation in all eight animals, rose significantly in only three LL-leprosy-susceptible animals after inoculation, and returned to near zero in all animals within 3 years.

Anti-LAM antibody levels appear to be potentially valuable as an indicator of leprosy susceptibility, and when measured longitudinally together with antibody levels to M. leprae-specific phenolic glycolipid-I antigen, as a means to detect preclinical M. leprae infections in high-risk individuals.

HUSSAIN, R. et. al. Quantitation of IgM Antibodies to the *M. leprae* Synthetic Disacharide Can Predict Early Bacterial Multiplication in Leprosy. *Int J. Lepr., 58(3),* p. 491-502, 1990.

Quantitative enzyme-linked immunosorbent assays detecting IgM to the soluble Mycobacterium leprae crude sonicate (CD75) and the synthetic disaccharide antigen coupled to bovine serum albumin (ND-BSA) were assessed for their ability to determine early infection in families/household contacts of leprosy patients and employers of a leprosy center working in close contact with leprosy patients. Although IgM to both antigens (CD75 and ND-BSA) correlated with the bacterial index (BI) assessed histologically on skin-biopsy samples, the level of IgM antibodies to ND-BSA was a much more sensitive indicator of low bacterial loads. A 4.4-fold difference in antibody levels was observed between the mean group levels of endemic controls (N=116) and tuberculoid leprosy patients with a BI of 0 (N=88), increasing to sevenfold in tuberculoid leprosy patients with a BI of 1 (N=20). Using a statistical cut off with endemic controls (mean+2S.D), household contacts showed 30% seropositivity (N=180) as compared to staff contacts who showed 17% seropositivity (N=55). Percent seropositivity in family contacts was not related to the type of leprosy of the index case (lepromatous vs. tuberculoid) or the duration of treatment of the index case. Age of the individual in the family contact group had a significant influence on seropositivity. These results support the hypothesis that In this community, factors other than the viable bacterial load of the index case, such as genetic susceptibility, may be influencing the high rate of seropositivity in family contacts. IgM ND-BSA antibodies seem to provide a good indicator of low antigenic loads and could prove to be useful in detecting subclinical infection before the onset of disease. Fóllow-upstudies of these seropositive individuals are in progress to understand the relationship between seropositivity and the progress of clinical disease.

JOB, C.K. et. al. Phagocytosis of *Mycobacterium leprae* by cardiac muscle cells - A Preliminary Report. *Ind. J. Lepr., 62(1),* p. 55-59, 1990.

Fetal cardiac muscle cells were shown to ingest M. leprae easily within 20 minutes of exposure in vitro. This phagocytosis is considered nonspecific and facilitated by the lipid coat of the mycobacteria. The presence of M. leprae free In the cytoplasm of the muscle cells did not seriously affect the morphology or rhythmic contractions of the cells. The significance of the presence of *M. leprae* in somatic cells needs further study.

MAKONKAWKEYOON, S. et. al. Immunologic Defects in Leprosy Patients. I. Evidence of Immune Aberration os Suppressor-T Lymphocytes in Lepromatous Leprosy. *Int.J. Lepr., 58(2),* p. 302-310, 1990.

Immunoregulation in various types of leprosy patients was evaluated in vitro using peripheral blood mononuclear leukocytes (PBML) stimulated with phytohemagglutinin-P (PHA-P) or concanavalin A (ConA) for a cell-mediated immune (CMI) assay or pokeweed mitogen (PWM) fora humoral mediated immune (HMI) assay. The immune responses were evaluated by a lympocyte transformation test (LTT) and lymphocyte-mediated cytotoxicity (LMC) for the immunoregulation of CMI, and a reverse hemolytic plaque assay for measuring the plaque-forming cells (PFC) and a sandwich ELISA for measuring IgG concentrations for the immunoregulation od HMI.

In LTT with PHA-P or ConA, the mean of the normal controls was not significantly different from the means of the untreated LL, BL, BB, BT, and TT leprosy patients. However, a wide variation of LTT results from BT to LL patients was noted: the LTT results of TT patients and normal controls were less variable. A similar pattern of immune responses was noted when studied by LMC in untreated LL, BL, BB, BT, and TT leprosy patients and normal controls. When the untreated patients and normal controls were studied for PFC, using PBML, stimulated with PWM, a very similar pattern of PFC was obtained with the different types of leprosy patients.

The immuno regulatory role of lymphocytes in leprosy patients was furtherevaluated by cell mixing cultures. ConA-stimulated PBML from lepromatous leprosy patients were mixed with normal PBML and then stimulated with PHA-P. The immune regulation was then measured by LMC. Untreated BULL patients having a bacterial index (BI) of 3+ or more had significantly less supressive activity than treated BULL patients having a BI of less than 3+, less than treated TT patients, and less than normal controls.

The activity of suppressor-T lymphocytes from untreated LL patients was further evaluated by the isolation of CD8 + T cells or ConA-sheep erythrocyte (SRBC) rosetted T cells from PBML of these patients and normal controls. The CD8+ T cells or ConA-SRBC rosetted T cells were cultured in various percentages with normal PBML and then stimulated with PWM. The immunoregulation of these T-cell populations was measured by quantitative determination of the PFC, using a reverse hemolytic plaque assay, or by quantitation of IgG with an ELISA. The CD8+ T cells and Con-A-SRBC rosetted T cells from these LL patients showed significantly less suppressive activities in all of the tested cell concentrations when compared with normal controls.

MAKONKAWKEYOON, S. et. al. Immunologic Defects in Leprosy Patients. II. Interleukin 1, Interleukin 2, and Interferon Production in Leprosy Patients. Int.J.Lepr., 58(2), p. 311-318, 1990.

The capabilities of monocytes and lymphocytes in peripheral blood mononuclear leukocytes (PBML) to produce interleukin-1 (IL- 1), IL-2, and interferon (IFN), respectively, were evaluated in various types and treatments of leprosy patients. IL-1 production in response to lipopolysaccharide was significantly lower in LL, BL, BB, and BT patients than in normal controls. However, there were no differences in IL-1 levels between TT patients and normal controls. The percentages of nonspecific-esterase positive cells adhering to the plastic surfaces were not different in LL, BB and TT patients when compared to normal controls. However, they were significantly higher in BT and BL patients than in normal controls.

When PBML from leprosy patients were stimulated with concanavalian-A (ConA) for IL-2 production, there were no differences in the IL-2 levels in treated BULL, untreated BULL, treated BUTT, and untreated BT/TT patients compared to normal controls. Similar results were obtained when PBML were stimulated with phytohemagglutinin-P (PHA-P). However, when purified protein derivative (PPD) was used as the stimulating agent, there were significantly lower IL-2 levels in treated BULL, untreated BULL, treated BT/TT, and untreated BUTT patients when compared to normal controls. There were also

lower IL-2 levels in untreated BULL and BT/TT patients compared to treated BULL and BT/TT patients, respectively.

PBML, were stimulated with PHA-P or ConA for IFN production. There were no differences in the IFN levels in treated BULL, untreated BULL, treated BT/TT, and untreated BT/TT patients compared to normal controls. However, when PPD was used as the stimulating agent, there were lower IFN levels in treated BULL, untreated BULL, and treated BT/TT patients compared to normal controls.

MEEKER, H.C. et. al. Sequential Monitoring of Leprosy Patients with Serum Antibody Levels to Phenolic Glycopidid-I, and Mycobacterial Lipoarabinomannan. *Int. J. Lepr., 58(3),* p. 503-511, 1990.

Sequential serum samples from leprosy patients at various stages of antibacterial treatment were tested by an ELISA for antibodies to phenolic glycolipid I (PGL-I), a synthetic PGL-I analog (ND-BSA), and lipoarabinomannan (LAM) Mycobacterium tuberculosis to determine if these antibodies could be useful in monitoring response to therapy. Among patients with positive initial anti-PGL-I IgM, a significant decrease in this antibody was seen over time ($p<0.01$), whether assayed by PGL-I or ND-BSA. The two antigens showed good agreement in the detection of decrease in anti-PGL-I IgM. The greatest decrease was seen in patients with a high initial anti-PGL-I IgM and a high bacterial index (BI). Patients with a declining BI were seen to have generally declining antibody levels to PGL-I and to LAM; in those patients with a fluctuating BI, antibody levels were less predictable. We conclude that antibodies to PGL-1 and LAM can be useful in following response to therapy in leprosy patients and that either native PGL-I or ND-BSA can serve as antigens for the ELISA.

MOUDGIL, K.D. et. al. Comparative Evaluation of Enzyme Immunoassays based on synthetic Glycoconjugates and phenolic glycolipid-I forimmunodiagnosis of leprosy. Ind. J. Lepr*., 62(1),* p. 60-65, 1990.

Enzyme immunoassays (ElAs) based on synthetic glycoconjugates containing the terminal monosaccharide (M-BGG) or disaccharide (ND-BSA) residue of the trisaccharide component of phenolic glycolipid-I (PGL-I), for immunodiag-nosis of leprosy are described. The results of the assays were compared with that of the EIA using PGL-I. All the three assays were highly specific for leprosy. The per cent positivity of active lepromatous leprosy (LL) patients with M-BGG was 78.05 in comparison to 85.36 with ND-BSA and 82.11 with PGL-I. Similarly, the positivity of tuberculoid (TT) leprosy patients in M-BGG assay was lower than that in ElAs using ND-BSA or PGL-I. However, the difference in the positivity of individual category of leprosy patients in the three ElAs was not statistically significant. The correlation between absorbance values of leprosy sera in ElAs based on M-BGG and PGLI, as well as that in assays using ND-BSA and PGL-I was statistically significant.

NAIR, I. & MAHADEVAN, P.R. Antigenic Protein from *Mycobacterium leprae* Released in Macrophages in vitro as Indicator of Viability of Bacteria. Int. *J. Lepr., 58(3),* p. 540-547, 1990.

Peritoneal macrophages from randombred, Swiss white mice, when cultured and infected with *Mycobacterium leprae* for 24 hours, are able to show the presence of antigen(s) with binding affinity to antibodies present in the sera of bacteriologically positive, lepromatous leprosy patients. Such antibodies are not seen in sera from normal and health persons, tuberculoid leprosy patients, or long-term-treated, bacteriologically negative, lepromatous leprosy patients. The production of the antigen(s) is blocked by the anti-*M. leprae* drug rifampin. Other mycobacteria when incubated with macrophages from mice show very litle antigens in the lysate but the antigens have an equal affinity for antibodies in sera from both normal individuals and lepromatous patients. Only the lysates from macrophages exposed to live *M. lepraecould* discriminate and could exhibit

differential binding to sera from leprosy patients compared to sera from normal individuals. This antigen(s) does not have any binding ability to the monoclonal antibodies available to the antigens of M. leprae identified at present and shown to be specific to M. leprae. This indicates a separate identity of this product which has potential for further exploitation in exploring host-pathogen interactions related specifically to the leprosy infection and the tolerance of M. leprae inside cells.

NAIR, I. et. al. Viability of *Mycobacterium leprae* Inside Macrophages from Different Strains of Mice and Possible Genetic Control. *Mt. J. Lepr., 58(3),* p. 548-553, 1990.

Peritoneal macrophages from Swiss white mice in vitro tolerated Mycobacterium leprae and allowed metabolism of the bacteria leading to release of bacteria-specific antigenic protein. This was associated with the maintenance of viability of the bacilli inside the cells. Macrophages from C57BL mice reduced viability of M. leprae after phagocytosis, and this was associated with the production of superoxide. Blockage of superoxide production resulted in maintaining viability of the cells of these mouse strains. Associated with loss of viability of the bacilli is the absence of the production of antigenic protein in the lysate. Interestingly, the maintenance of viability or loss of viability and the factors controlling such viability in the macrophages of Swiss white ands C57BL mice, respectively, appeared to be genetically controlled.

QINXUE, Wu. et. al. Rapid Serodiagnosis for Leprosy-A Preliminary Study on Latex Agglutination Test. *Mt. J. Lepr., 58(2),* p. 328-333, 1990.

In this study, we have developed two latex agglutination tests (LATs) with phenolic glycolipid (PGL-I) and natural disaccharide-oct ylbovine serum albumin (ND-O-BSA) as antigens In 110 leprosy patients (LL=30, BL=30, BT=30, and TT = 20), 50 tuberculosis cases , and 30 normal controls. These two LATs were compared with corresponding ELISAs (ND-O-BSA ELISA and PGL-I ELISA) and analyzed bythe chi-squared test. There were no significant differences between the two LATs (PGL-I LAT and ND-O-BSA LAT) and their corresponding ELISAs. There was an increase in the proportion of positive cases detectable which coincided with the clinical classification of leprosy, i.e., lepromatous cases were more likely to be positive than tuberculoid cases. LATs are more simple and rapid than ELISAs and have high sensitivity (77% in ND-O-BSA LAT, 80.5% in PGL-I LAT) and specificity (99% in both LATs). LATs may become useful tools for the immunodiagnosis of leprosy in the field. The stability and repeatability of LATs are discussed in detail.

RAPOPORT, B.L. et. al. A study of Autoantibodies in Chronic Mycobacterium Infections. *Mt. J. Lepr., 58(3),* p. 518-525, 1990.

Infections can cause autoantibody production. The purpose of this study was to determine the prevalence of autoantibodies in patients with chronic mycobacterial infections. Sera from 41 leprosy patients ans from 49 untreated and 73 treated tuberculosis (TB) patients were tested for the presence of rheumatoid factor, antinuclear factor, and several other autoantibodies. The rheumatoid factor. measured by the RheumaTec RF latex test, was positive in 2.4% of the leprosy patients and 2.7% of the treated TB patients but absent in the untreated TB group. The titers ranged from 40 to 180 international units. Positivity was dependent upon the technique utilized, and existed in 21% of untreated TB group and 4% of the treated TB patients when using the Rheuma-Wellcotest technique. The antinuclear antibody was positive in 7.3% of the leprosy group, 6.1% of the untreated TB group, and 15% of the treated TB patients (p=0.0125). Antinuclear antibody positivity correlated with the duration of treatment of the TB patients (p=0.025). The antinuclear antibody titers were low and gave no specific pattern on staining. No patient had antibodies against native deoxyribonucleic and, ribonuclear protein. Ro (SS-A) or La (SS-B) antigens.

Due to their low prevalence and frequency in these chronic infections, these autoantibodies should not lead to confusion in distinguishing these conditions from the connective tissue diseases.

ROCHE, P.W. et. al. Heterogeneity of Serological Responses in Paucibacillary Leprosy-Differential Responses to Protein and Carbohydrate Antigens and Correlation with Clinical Parameters. *Int. J. Lepr., 58(2),* p. 319-327, 1990.

We have examined the serological responses of 154 untreated paucibacillary (PB) leprosy patients to two carbohydrate and one protein antigens of Mycobacterium leprae. There was a heterogeneous response with 20% of PB patients having IgM anti-PGL-1 antibodies and a similar proportion with IgG anti-LAM antibodies, while 33% had antibodies to the M. leprae-specific epitope on the 35-kDa protein. There was overlap in the responses such that 43% of the patients were seropositive in one of the two M. lepraespecific assays, while 49% were positive in any assay. There was a gradation in seropositivity with increasing extent of disease for each of the clinical parameters measured. Those with established disability at the time of presentation were more likely to be seropositive in each assay.

ROCHE, P.W. et. al. Operational Value of Serological Measurements in Multibacillary Leprosy Patients: Clinical and Bacteriological Correlates of Antibody Responses. *Int. J. Lepr., 58(3),* p. 480-490, 1990.

The antibody responses of 100 previously untreated multibacillary (MB) leprosy patients to one protein and two carbohydrate antigens were examined: 94% of the patients had Mycobacterium leprae-specific antibodies; 89% directed to the species-specific epitope on phenolic glycolipid (PGL-I), 89% against the specific epitope on the 35-KDa protein, and 94% against one or both of the two. By contrast, 67% of the patients had anti-lipoarabinomannan (LAM) antibodies. There were trends for the seropositivity rate and the antibody level to rise with the increasing extent of the disease and as patients moved to the polar lepromatous end of the spectrum. The bacillary load, as measured by the bacterial index, was moderately correlated with the IgM antiPGL-I and the anti-35-kDa antibody levels and, to a lesser extent, with the IgG antibodies directed at the common mycobacterial carbohydrate LAM. The sensitivity of the IgM anti-PGL-I antibodies for detecting smear-positive MB disease was 91%; that for the anti-35-kDa antibodies was 92%.

ROY, A. et. al. Anti-arabinogalactan IgM/IgG Ratio: A screening index for leprosy patients. *Ind. J. Lepr., 62(4),* p: 435-442, 1990.

The serological activities of arabinogalactan from *M. smegmatis* and phenolic glycolipid-1 from M. leprae were examined by Enzyme Linked immunosorbent Assay using sera from 88 patients with leprosy (44 treated and 44 untreated) and 45 normal healthy individuals. Both IgM and IgG type of antibodies were measured agaisnt these antigens. The results confirmed the previous observation that anti phe-nolic-glycolipid-1 IgM antibodies are higher in lepromatous leprosy cases than in normal individuals. However, with arabinogalactan, the ratio of IgM/IgG was more than one in normal individuals and less than one in untreated LL patients. Treated patients fell in both categories. Moreover, a reverse relationship was found between anti PGL1 IgM titers and anti arabinogalactan IgM/IgG ratio.

SCOLLARD, D.M. et. al. Studies of Human Leprosy Lesions in situ Using Suction-Induced Blisters. 2. Cell Changes and Soluble Interleukin 2 Receptor. *Int. J. Lepr., 58(3),* p. 469-479, 1990.

To examine the pathogenesis of type 1 (reversal) reactions in leprosy, we studied cellular and soluble immunologic components of skin lesions in 10 patients with reactions, 24 active patients without reactions, and 33 control patients

whose leprosy had been treated and cured. Cells and Tacpeptide levels were obtained from fluid aspirated from blisters induced by suction directly over representative skin lesions. During reversal reactions: a) the lesions contained an increased number and percentage of CD4+ (T-helper) cells; b) Tacpeptide levels were elevated in half of the lesions; c) the Increases in Tac peptide and (CD4 + cells) were directly correlated; and d) systemic administration of corticosteroids appeared to cause a reduction in the intralesional CD4+cell population. These findings were localized to the skin, and do not represent simple filtration of these components from the peripheral blood. We conclude that spontaneous lymphocyte activation in situ, primarily of CD4+cells, is an important feature of reversal reactions, and may be an intermittent or cyclic phenomenon during the reaction. Findings in active patients without reactions are consistent with the hypothesis that differing states of immunologic equilibrium have been established in different portions of the leprosy spectrum. In reversal reactions we may, therefore, be examining immunologic processes set in motion when a pre-existing equilibrium has been upset by spontaneous, natural events. The mechanism of such spontaneous changes in immunity in leprosy is of considerable interest, not only to understand the reaction, but also to examine the underlying determinants of delayed-type hypersensitivity and cell-mediated immunity in leprosy and the potential for artificially manipulating these responses, as proposed with vaccines or immunotherapy.

SHROFF, K.E. et. al. Pathogenesis of Route-related Variation in T-supressor Response on Immunization with Mycobacteria. *Int.J. Lepr., 58(1),* p. 50-57, 1990.

The route of immunization was observed to play a significant role in deciding the outcome of immunization with killed mycobacterial vaccines. Earlier we reported that the slow growers were immunogenic by both the intraperitoneal (i.p.) and intradermal (i.d.) routes. In contrast, the rapid growers were immunogenic by the i.d. route only. Both rapid and slow growers generated the classical, antigen-specific Lyt-2 positive, T-cell-mediated suppression after i.p. immunization but not after i.d. immunization. Thus, in the case of the slow growers, T-cell-mediated suppression was only a component of the immune response generated after i.p. immunization. In contrast, in the case of *Mycobacterium vacate* and the other rapid growers, the T-cell-mediated suppression was the predominant response with i.p. immunization. The T-cell-mediated suppression generated by i.p. immunization exhibited crossreactivity, the spectrum of which was dependent upon the dose of the immunization.

SHROFF, K.E. et. al. Route-related in Immunogenicity of Mycobacteria. *Int. J. Lepr., 58(1),* p. 44-49, 1990.

The route of immunization was observed to play a significant role in deciding the T-cell response to immunization with killed mycobacterial vaccines. Slow-growing mycobacteria were found to be immunogenic by both the intraperitoneal (i.p) and intradermal (i.d.) routes; rapid-growing mycobacteria were immunogenic by the i.d. route only.

The nonresponder state following i.p. immunization with *Mycobacterium vacate* could be corrected by treatment of the mice with poly I: poly C or indomethacin prior to immunization. Both poly I: poly C, an interferon inducer, and indomethacin, a prostaglandin inhibitor, are known to enhance the expression of major histocompatibility complex glycoproteins. Since they are so important in antigen preparation, it was concluded that the inability of mice to respond to *M. vacate* by the i.p. route is likely due to defective presentation of the bacterial antigens by the antigen-presenting cells at the site, namely, the peritoneal macrophages. These findings are significant because *M. leprae* has been reported to be antigenically similar to *M. vaccae,* and the response of mice to i.p. Immunization with booth of these mycobacteria is very similar.

SHROFF, K.E. et. al. Variation in Immunogenicity of Mycobacteria: Role of Antigen-presenting Cells. Int. *J. Lepr., 58(1),* p. 58-64,1990.

The antigen-presenting efficiency of peritoneal cells and irradiated spleen cells was compared using *Mycobacterium tuberculosis* - and *M.* vaccae-primed T cells and corresponding sonicates as antigens in an in vitro lymphocyte transformation test. The presentation efficiency of irradiated spleen cells was reasonably good for both antigens. However, with peritoneal cells as the antigen-presenting cells, the proliferative response against only *M. tuberculosis* sonicate was good. Proliferation of *M.* vacate-primed T cells was very poor when the antigen was presented by peritoneal cells. Poly I: poly C treatment of mice prior to harvesting the peritoneal cells resulted in distinct improvement in their efficiency to present *M.* vaccae sonicate, maximal proliferative response was obtained with peritoneal cells from mice receiving two and three doses of poly I: poly C 24 hr apart. Even paraformaldehyde-fixed peritoneal cells from poly I: poly C-treated mice gave an efficient *M.* vacate-specific stimulation to primed T cells. Based on these data, it was concluded that faillure of mice to respond to *M. vacate* by intraperitoneal immunization is the result of the poor efficiency of presentation of *M. vacate* antigen.

SULCEBE, G. & NAKUÇI, M. Anti-phenolic glycolipid 1 IgM antibodies in leprosy patients and in their household contacts. *Leprosy Review, 61(4),* p. 341-346, 1990.

Through they have no apparent protective action, the specific antibodies are important markers of the infection with *Mycobacterium leprae.* For their detection we employed an ELISA method using as substrate a synthetic immunodominant disaccharide of phenolic glycolipid I antigen of *M. leprae,* conjugated with bovine serum albumin (D-BSA). Increased levels of anti D-BSA antibodies of the IgM class were detected in 61.5% of the 13 leprosy patients and in 13.3% of their 53 household contacts, where as they were not found in any of the 37 normal blood donors. A strong correlation (r=-0.846) was found between the antibody levels and the duration of the disease among the 12 patients with lepromatous leprosy.

These preliminary data demonstrate the usefulness of this method for epidemiological studies and for the detection of cases with of cases with subclinical infection.

TRUMAN, R.W. et. al. Antibodies to the phenolic glycolipid-1 antigen for epidemiologic investigations of enzootic leprosy in armadillos *(Dasypus novemcinctus). Leprosy Review, 61(2),* p. 19-24, 1990.

Other than man, nine-banded armadillos *(Dasypus novemcinctus)* are the only known natural hosts of leprosy with high rates of disease. The origin, range and risk of their infection is not yet clear and a better description of the rate of leprosy over the armadillo's range is needed. Both histopathological examination of armadillo ear tissues and serologic screening for IgM antibodies to the phenolic glycolipid-I (PGL-I) antigen of *Mycobacterium leprae* are good relative indices of enzootic prevalence. A survey of 216 armadillos from Louisiana and Florida detected infection only among Louisiana animals. Average antibody prevalence (12.5%) was five times higher than the fully disseminated disease rate described histopathologically (2.7%). The differences in antibody and histopathological prevalence are due to the sensitivity of the methods for detecting early infection. Histopathological examinations describe an advanced disease. The higher antibody prevalence of wild armadillos is not likely to be result of false positive serologies from self-healing infections or other casual encounters with *M. leprae* as might be mimicked by lepromin injection. The environmental reservoir of *M. leprae* represented by infected armadillos is greater than could be previously estimated.

TYAGI, P. et. al. Activation of Complement by Circulating Immune Complexes Isolated from Leprosy Patients. *Int.J. Lepr., 58(1),* p. 31-38, 1990.

Circulating immune complexes isolated from different types of leprosy sera as polyethylene glycol (PEG) precipitates were found to be efficient activators of the alternative pathway of complement. PEG precipitates from BULL leprosy patients and those with erythema nodosum leprosum were found to activate both classical pathway and the alternative patway of complement efficiently, while PEG precipitates from TT/ BT leprosy patients and borderline tuberculoid patients in reaction were found to active the alternative pathway of complement but not the classical pathway. No significant differences were observed between the PEG precipitates from reactional and nonreactional TT/BT and BULL patients in their complement activating ability.

VACHULA, M. et. al. A Comparison of Monocyte Oxidative Responses in Leprosy Patients and Healthy Subjects as Influenced by Mycobacterial Lipid Pretreatment. *Int J. Lepr. 58(3),* p. 534-539, 1990.

Superoxide anion (O_{2^-}) release by monocytes from leprosy patients in a paired study was lower than that released by monocytes from healthy controls. Pretreatment of healthy control monocytes with phenolic glycolipid-I (PGL-I) of Mycobacterium leprae resulted in the release of less O_2 than released by buffer-treated cells or cells pretreated with structurally similar lipids. However, pretreatment of patient monocytes with PGL-I did not affect the O_2 generation, perhaps because the cells already had a lower capacity to produce O_2 . Upon further examination of the data from the patient population, monocytes from lepromatous patients released significantly less 0_2 than cells from normal controls, while tuberculoid patient cells released 0_2 in amounts similar to that generated by cells from normal controls. In addition, monocytes from patients with a high bacterial index had a lower capacity to generate O_2 when compared to cells from healthy individuals.

VACHULA, M. et. al. Effect of Mycobacterium leprae's Phenolic Glycolipid-I on Interferon-gamma Augmentation of Monocyte Oxidative Responses *Int J. Lepr., 58(2),* p. 342-346, 1990.

Peripheral blood monocytes were pretreated with phenolic glycolipid-I (PGL-I) dimycocerosyl phthiocerol (DIM), or mycoside A, then cultured in the presence or absence of interferon-gamma (IFN-'y). Their oxidative responses to *Mycobacterium leprae,* phorbol myristate acetate (PMA), and opsonized zymosan were evaluated. In response to *M. leprae,* monocytes pretreated with PGL-I released less 02 than nonlipid-treated control cells. The IFN-y augmentation of oxidative responses was suppressed only in PGL-I-pretreated monocytes and only when the stimulus was *M. leprae.* This suggests that PGL-I, by affecting the IFN-y enhancement of phagocytic cell oxidative responses, aids further the intracellular survival of *M. leprae.*

ANDERSEN, P. et. al. Proliferative Response to Seven Affinity Purified Mycobacterial Antigens in Eight Strains of Inbred Mice. *Int.J. Lepr., 59(1),* p. 58-67, 1991.

This study compares the T-cell-stimulating ability of different mycobacterial antigens. The responses to crude culture filtrates and seven affinity-purified antigens were investigate in eight strains of inbred mice. Large differences In the stimulating abilities of the antigens were observed, and four antigens were found to give a powerful T-cell stimulation. Some antigens divided the strains into high and low responders, while a 17-kDa antigen was found to be exceedingly T-cell stimulatory in mice of all tested haplotypes. The responses of the eight strains were analyzed by comparing the response patterns of the strains. Using a statistical model based on antigen ranking, five strains were found to have a similar response pattern: three strains were found to differ. These results demonstrate the significance

of the choice of mouse strain in studies of mycobacterial immunology and, furthermore, indicate that when research is conducted to develop new mycobacterial vaccines, it is important to include panels of antigens.

CHANTEAU, S. et. al. Evaluation of gelatin particle agglutinaton assay for the detection of anti-PGLI antibodies. Comparison with ELISA method and applicability on a large scale study using blood collected on filter paper. *Leprosy Review, 62(3),* p. 255-261, 1991.

Given the technical difficulties of the ELISA method, a gelatin particle agglutination test (MLPA) has been developed recently for the detection of anti-PGLI antibodies. The purpose of this study was to compare these 2 tests. MLPA was found to be less specific than ELISA (91% versus 98%, x"=66.8, p<0.001). The sensitivity of both tests was of 95% for the diagnosis of multibacillary patients. In the case of paucibacillary patients. MLPA was found to be less sensitive than ELISA (21% versus 35%, x^2=6.98, p<0.01). The agreement between the 2 tests for a positive or a negative result was satisfying (85% to 100%), except for the weakly seropositive individuals (71%). The correlation between OD obtained with ELISA and antibody titre obtained with MLPA was statistically significant (r=0.70, p<0.001). Conversely to ELISA, MLPA was not applicable on blood samples absorbed on filter paper without a serious loss of sensivitivity. In conclusion, this study demonstrated that the MLPA test can only reliably detect anti-PGLI antibodies in a multibacillary cases.

CHATURVEDI, Vinita. et. al. Association of mycobacterial-specific and Mycobacterium leprae specific antibody levels with clinical activity in tuberculoid leprosy: a comparative study of three serological enzyme-immunoassays. *Leprosy Review, 62(2),* p. 122-133, 1991.

The ELISA for polycional antibodies against Mycobacterium leprae (ML-ELISA) and specific antibodies against epitopes on 35 kDa protein (SACT-ELISA) and phenolic glycolipid I (PG-ELISA) of M. leprae were evaluated comparatively in a group of 88 tuberculoid leprosy patients. The overall seropositivity rate with a battery of 3 tests (68%) was not significantly higher than that obtained with ML-ELISA alone (55%) for IgG class of antibodies. Seropositivities for SACT ELISA and PG ELISA were, respectively, 38% and 26%, ML-ELISA for IgM class of antibodies was least sensitive, showing only 8% positivity.

A significant correlation was noted between individual values of the three assays, but the positive proportions overlapped maximally in the case of ML ELISA (IgG) and SACT ELISA. Further, positivity for the latter two assays, particularly SACT-ELISA, showed significant associations with the extent of 'active' (largely untreated) infection.

Immunoloblotting revealed that the main antibody response was directed towards M. leprae antigens in the molecular weight range 20-40 kDa and the densitometry results of this zone correlated significantly with corresponding SACT-ELISA and ML-ELISA (IgG) values.

CHO, S.N. et. al. Detection of Phenolic GlycolipidI Antigen and Antibody in Sera from New and Relapsed Lepromatous Patients Treated with Various Drug Regimen. Int. J. Lepr., 59(1), p. 25-31, 1991.

Since phenolic glycolipid-I (PGL-I) is an unequivocal marker of Mycobacterium leprae, the antigen has been a good candidate for the serodiagnosis and monitoring the effectiveness of leprosy chemotherapy. As an effort to define the kinetics of the PGL-I antigen and its antibodies in leprosy patients, this study was initiated to examine the serum specimens obtained serially from lepromatous patients under chemotherapy trials. PGL-I was detectable in 64 (94.1%) of 68 new lepromatous (bacterial index, BI=3.2 to 5.8) and in 26 (78.8%) of 33 relapsed lepromatous patients (BI=3.0 to 5.3). Meanwhile, virtually all of the new and relapsed patients were strongly

seropositive to PGL-I. PGL-I was not detectable in any of the patients about 18 months after chemoratherapy was initiated; however, anti-PG L1 reactivity declined by 50% at 2 years and by about 70% at 5 years after chemotherapy regardless of the drug regimens under study. Considering the rapid disappearance of the PGL-I antigen and steady decrease in anti-PGL-I IgM antibodies following chemotherapy, the PGL-1 based serology may be useful for monitoring the effectiveness of treatment, at both the early and late stages, in leprosy patients whose initial sera contain a significant level of PGL-I antigen or antibodies.

CHUJOR, C.S.N. et. al. Serum Antibodies Against Peripheral Nervous System Antigens in Leprosy. *Int.J.Lepr.* 59(4), p.590-597, 1991.

Since antibodies against peripheral nervous system (PNS) antigens may play a pathogenetic role in the mechanism of nerve damage in leprosy, sera from leprosy patients and contacts were investigated for anti-PNS antibodies by ELISA and immunoblot. In ELISA, elevated anti-PNS antibody levels were detected in 4 of 98(4.1%) leprosy patients (4 of 52,7.7%), lepromatous leprosy patients, in 1 of 28 (3.6%) contacts, and in 1 of 18 (5.6%) normal controls. There was no correlation between anti-PNS antibody levels and the bacterial index or neuropathy in leprosy. Immunoblot with a sample of six lep rosy and five control sera showed that the antigenic binding pattern (mainly within the 100-200-kDa region) was very similar in patients and controls. Staining intensity, however, appeared to be higher with the leprosy sera than with the control sera. IgM and IgG were found to contribute to the staining pattern: IgM in the 150-200-kDa range, IgG with multiple bands between 25 kDa and 200 kDa. Thus, the presence and levels of serum anti-PNS antibodies in leprosy appear to be unrelated to parameters of disease activity, neuropathy in particular, and do not seem to be critically involved in the pathogenesis of nerve damage.

CHUJOR,C.S.N. et. al. Serum IgA and IgM Antibodies Against Mycobacterium leprae-derived Phenolic Glycolipid-I: A Comparative Study in Leprosy Patients and Their Contacts. *Int.J.Lepr.,59(3),* p.441-449, 1991.

In order to evaluate the potentials of IgA_1, versus IgM as well as of native phenolic glycolipidI (PGL-I) versus PGL-I-disaccharide coupled to bovine serum albumin (D-BSA) as antigens in the serodiagnosis of leprosy, anti-D-BSA IgA_1, and anti-PGL-I IgM were investigated and compared to anti-PGL-I IgA_1, in sera from patients and contacts.

Anti-D-BSA and anti-PGL-I IgA_1, significantly correlate in patients and contacts. The higher IgA_1, positivity rates obtained with D-BSA as compared to PGL-I may suggest D-BSA as the favorable antigenic material. In patients but not in contacts anti-PGL-I IgM and IgA_1, correlate, IgM predominating over IgA_1. In all three antibody systems, the mean values as well as the positivity rates increased from the tuberculoid toward the lepromatous disease pole. Also, the levels of all three antibodies significantly increased with the bacterial index (BI).

However, anti-D-BSA (PGL-I) IgA_1 appears to be preferable to IgM with respect to sensitivity, I.e., detection of disease activity, in paucibacillary or BI-negative patients. A number of contacts were detected as seropositive with anti-D-BSA and/or anti-PGL-I IgA_1 but not with anti-PGL-I IgM. This suggests that IgA_1 is a better tool than IgM for the detection of leprosy in its subclinical stage.

KAUR, J. et. al. Enzyme Innnunoassay of Phagocytosis Stimulating Tetra-peptide "Tuftsin" in Normal and Leprosy Sera. *Int.J.Lepr.,59(4),* p. 576-589, 1991.

The serum concentrations of the phagocytosis stimulating the tetrapeptide, tuftsin, were determined by competitive enzyme immunoassay in borderline tuberculoid/tuberculoid (BT/TT, 16 cases), borderline lepromatous/ lepromatous (BL/LL, 16 cases), and in healthy controls (20 cases). Using checkerboard titration, 10 ng/well of diphtheria toxoid-p-

amino phenylacetyl tuftsin (DTPT) conjugate when incubated with tuftsin antisera at 1:15,000 dilution with a preincubation time of 60 min with the competitor (tuftsin) followed by a further 60 min incubation onto the DTPT-coated wells gave consistent results with a sensitivity of 5 ng/well tuftsin. The mean serum tuftsin concentration was significantly lower in BULL patients (134.42 t 48.7 ng/ml, $p < 0.01$) than in healthy controls (262.86 ± 59.8 ng/ml), while BT/TT sera (210.94 ± 75.5 ng/ml) showed slightly decreased levels than did normals, which was not statistically significant. The mean serum IgG levels in BULL and BT/TT patients (37.26 ± 10.99 mg/ml; 28.08 t 6.57 mg/ml, respectively) showed significantly ($p < 0.001$) higher concentrations than did healthy controls (12.3 ± 3.6 mg/ml). These observations on the serum concentrations of tuftsin and IgG in leprosy individuals suggest that there is splenic dysfunction in BULL patients in terms of the processing of leukokinin to release the free, active molecule tuftsin.

LAUNOIS, P. et. al. *M. leprae* and BCG - induced Chemiluminescence Response of Monocytes from Leprosy Patients and Healthy Subjects: Effects of Gamma-Interferon and GM-CSF. Int.J.Lepr.,59(4), p. 582-589, 1991.

Mycobacterium leprae, in contrast to BCG, failed to trigger any chemiluminescence (CL) response in mononuclear cells from either leprosy patients or healthy subjects a deficit not reversed by either interferon-gamma or GM-CSF. Chemiluminescence responses induced without mycobacteria or with BCG were found to be lower in leprosy patients than in controls. *M. leprae were* also less well phagocytosed than BCG. However, there was a significant difference in phagocytosis between healthy and tuberculoid leprosy subjects. Phagocytosis was not altered by the addition of either lymphokine, and no major differences between healthy subjects and patients were observed. Preincubating mononuclear cells with anti-mycobacteria antibodies (lepromatous patients' sera) did not increase the CL response nor the phagocytosis of *M. leprae* or BCG.

LEFFORD, M.J. et. al. The Value of IgM Antibodies to PGL-I in the Diagnosis of Leprosy. *Int.J.Lepr.,59(3),* p. 432-440, 1991.

An ELISA has been used to measure IgM antibodies to phenolic glycolipid-I (PGL-I) in previously undiagnosed patients who were suspected of leprosy on purely clinical grounds. The certainty of clinical diagnosis was classified as either"firm" or"indefinite." Leprosy was confirmed in 133 of 161 patients on the basis of positive slit-skin smears and/or skin and/or nerve histopathology. All 58 patients with multibacillary leprosy (BB, BL, or LL) were correctly diagnosed clinically, as were 50 of 54 patients (93%) with a firm diagnosis of BT or TT leprosy. The firm clinical diagnoses were more accurate than either the slit-skin smear or ELISA data. However, there were 44 patients (27% of total), designated "rule out leprosy" (RO), for whom the clinical diagnosis was indefinite. The clinical suspicion of leprosy (RO) was correct in only 24 (55%) of these patients who had BT leprosy. The slit-skin smears were positive in only 20% of these patients compared to 50% for the ELISA. It was concluded that the PGL-I IgM ELISA may have its greatest diagnostic confirmatory value in paucibacillary disease because paucibacillary leprosy comprises the major source of clinical diagnostic difficulty.

RAMESH, V. et. al. Multibacillary Leprosy Presenting as a Solitary Skin Lesion; Report of Three Cases and its Significance in control Programs. *Int. J, Lepr.,59(1),* p.1-11, 1991.

It Is held that immune complexes (IC) play a vital role in the pathogenesis of some of the reactions in leprosy. The complement system is known to solubilize and render IC innocuous. We have previously shown that patients undergoing lepra reactions had lowered complement-mediated IC solubilization (CMS). We, therefore, undertook a prospective study of untreated multibacillary leprosy patients and monitored their CMS levels sequentially while on therapy. In addition, the concentrations of the complement component C3d, immunoglobulins G, A and M, and circulating immune complexes (CIC) were also

estimated. A total of 26 patients were included in the study and were investigated at 3-month intervals for 3 years. Thirteen of the 14 patients who did not develop reactions at all had normal CMS values, although all of them showed elevated CIC. From the inception of treatment, 10 of the 12 patients who developed lepra reactions had low CMS values which remained below normal levels even after evidence of complement activation disappeared and long after the subsidence of reaction. It is suggested that this defective CMS acts as a predisposing cause of lepra reactions.

RASHEED, F.N. et. al. Specificity of lymphocytotoxic autoantibodies (LCAbs) found in the serum of leprosy patients: Class I MHC antigens. Leprosy Review, 62(1), p. 13-20, 1991.

Lymphocytotoxic autoantibodies (LCAbs) of the IgM class have been identified in patients with borderline tuberculoid (BT) and borderline lepromatous (BL) leprosy with Type I reactions (I) as well as lepromatous leprosy (LL) patients with *erythema nodosum leprosum* reactions (ENL). The observation that lymphocytotoxic activity (LCA) was reduced in the presence of platelets led us to determine whether LCAbs had specificities for Class I Major Histocompatibility Complex (MHC) determinants. Absorption of LCA positive sera with platelels, classically used to deplete Class I specific lymphocytotoxic antibodies, reduced LCA towards autologous as well as allogeneic target cells. This was true for LCA positive sera from all patient classifications (group BT in the autologous system, $p < 0.01$; in all other patient groups, $p < 0.001$). Introducing B-2m to cytotoxicity assays only marginally reduced LCA when added at high concentrations (5 mg/ml). An anti-Class I MHC; antiserum which blocked the lytic activity of Class I tissue typing sera did not inhibit lymphocytotoxic activity. The data indicate that LCAbs while absorbed by platelets, are not specific for the Class I MHC antigens. The autoantigen recognized by these autoantibodies therefore remains to identified.

SEHGAL, V.N. Soluble Interleukin-2 receptors: levels in leprosy, and during and after Type 1(lepra) and Type 2 (ENL) reactions. *Leprosy Review, 62(3),* p.262-268, 1991.

Twenty-five patients with Type I (lepra) and Type 2 (ENL) reactions, were assayed for SIL-2R in serum-before and after treatment for their acute condition-and the results were compared with 10 normal healthy adults and 20 patients of leprosy per se. Classification of each subject into different leprosy groups, and into various types and subtypes and of reactions, was done according to standard criteria, prior to inclusion into the study. Detailed statistical evaluation of the data revealed significantly higher levels of SIL-2R in all leprosy patients, as compared to normal controls, with higher levels in the multibacillary groups as compared to the paucibacillary group. SIL-2Rs appeared higher in Type I upgrading reaction than in other forms of reaction, though this was not statistically significant.

There was no significant change in levels following treatment and clinical remission.

SHAW, M.A. et. al. Setting up HIV serology for the Karonga leprosy vaccine trial in Malawi. Leprosy Review, 62(1), p. 87-104, 1991.

As part of the leprosy vaccine trial taking place in Karonga District, Northern Malawi, it is essential to establish whe ther the presence of HIV infection in the population is affecting the incidence rale or clinical presentation of leprosy or the effectiveness of the trial vaccines. To obtain the appropriate information, a rapid and economical HIV testing protocol, which could be performed in a rural laboratory and would be robust under variable environmental conditions, had to be developed. This paper reports on the development/ evaluation phase of a multitest protocol based on commercially available particle agglutination and ELISA anti-HIV antibody detection kits. The protocol was devised by first evaluating a range of kits in London using a battery of African and non-African sera and then field testing 1455 sera In Malawi, which included 184 sera from leprosy patients and 60 sera from syphilis patients to

check for cross-reactivity. According to the protocol developed, all sera are screened initially both by indirect ELISA (Organon) and using a rapid and economical modification of the Serodia particle agglutination test. Positives are retested using both a competitive ELISA (Wellcome or Behring) and the standard Serodia particle agglutination test. The validity of this multitest protocol was confirmed by Western blotting a large sample of the positive and negative Malawian sera in London. Factors affecting kit selection, and problems associated with individual kits, are discussed. While the specific multitest protocol developed for Malawi might not be suitable for every project, the principle of developing economical alternatives to Western blotting is an important consideration for any field investigation of HIV.

SINGH, N.B. et. al. Detection of M. leprae-specific Antigens with Dot-ELISA in Urine and Nasal Samples from Leprosy Patients. *Int.J.Lepr.,59(3),* p.396-404, 1991.

One-hundred-two urine and nasal samples collected from leprosy patients of different classifications of disease were studied for the presence of *Mycobacterium leprae* antigens, including phenolic glycolipid-I (PGL-I). Lipids were extracted from the urine samples, and nasal washings were concentrated and used as such in the dot-ELISA. Two types of primary antibodies, a polycional antibody obtained from lepromatous (LL) leprosy patients' pooled and absorbed sera and an anti-PGL-I monocional antibody, were used for the detection of *M. leprae* antigens from these samples. The polyclonal sera detected 23% to 36% of the paucibacillary (PB) and 100% of the multibacillary (MB) leprosy cases from the urine samples. Corresponding values for nasal detection were 0% to 18% for PB and 100% for MB cases. The monocional antibody against PGL-I could not detect tuberculoid (TT) leprosy cases. From the urine samples, however, 16% of the borderline tuberculoid (BT), 25% of the borderline (BB), 80% of the borderline lepromatous (BL), and 100% of the LL leprosy cases were detectable. It was interesting to note that PB, skin-smear negative cases were detectable from urine exam[nation. The specificity and sensitivity of the test is discussed in relation to the crossreacting antigens.

SHROFF, K.E. et. al. Major Histocompatibility Complex Restriction of T-cell Suppression of Immune Response to Mycobacteria. *Int.J.Lepr.,59(1),* p.49-57, 1991.

In earlier work, intraperitoneal (i.p.) immunization with *Mycobacterium vaccae* was shown to generate a T-suppressor (Ts) response but intradermal (i.d.) immunization did not. We have now-studied the major histocompatibility complex (MHC) restriction of this Is response. The ability of C57BU6 (H-2^b), BALB/c (H-2^d), and the (C57BU6 x BALB/c) F_1 mice to generate suppression after i.p. immunization with 10^8 killed *M. vacate* was investigated. The BALB/c and the F_1 mice generated suppression, but the C57BU6 mice failed to do so. The suppression could be ascribed to Lyt-2+, L3T4- antigen-specific T cells. The F_i, suppressors generated after i.p. immunization could suppress the generation of T-cell responses to i.d. immunization with *M. vaccae* in the parental BALB/c but not in the C57BU6 mice. Monocional anti-I-A antibody could suppress the antigen-induced proliferative response of mice primed i.d. with M. *vaccae.* In contrast, monocional anti-I-E antibody enhanced antigen-specific proliferation of spleen cells primed i.p. with *M. vaccae.* The suppressors generated by i.p. priming of mice with *M. vaccae* could also suppress the *in vitro* antigen-induced proliferative response of i.d.-primed spleen cells; the suppression could be blocked by anti-I-E antibody. Thus, the T-cell-mediated suppression in the above experimental model was I-E restricted. The inability of the C57BU6 mice to generate suppression after i.p. immunization with *M. vaccae* was ascribed to the lack of I-E expression by mice of H-2^bstrain.

ULRICH, M. et. al. IgM Antibodies to Native Phenolic Glycolipid-I in Contacts of Leprosy Patients in Venezuela: Epidemiological Observations and a Prospective Study of the Risk of Leprosy. *Int.J.Lepr.,59(3),* p. 405-415,1991.

In a randomized, double-blind vaccine trial in Venezuela, about 29,000 contacts of leprosy patients have been vaccinated with either a mixture of heat-killed Mycobacterium leprae and BCG or BCG alone, and are being resurveyed annually to detect new cases of leprosy. All contacts had a serum sample collected at the time of entry into the trial, and 13,020 of these sera have been analyzed for antibodies to phenolic glycolipid-I (PGL-I). Antibody levels have been related to various characteristics of the contacts and to their risk of developing leprosy in the following 4 years. A strong association was found between PGL-I antibody level and the risk of developing leprosy, in spite of possible modification of the incidence rate induced by vaccination. Antibody levels were higher in females than in males, and declined progressively with age. Household contacts had higher levels than did nonhousehold contacts, and levels were higher in individuals from the state in Venezuela which has the highest incidence of the disease. No substantial differences were found in antibody levels between contacts of multibacillary and paucibacillary patients, which may in part reflect the influence of treatment, and there was no clear association with the presence of BCG or lepromin scars or with skin-test responses to PPD and leprosy soluble antigen.

The assay of antibodies to PGL-I seems unlikely to provide a sensitive or specific test for infection with M. leprae and measuring PGL-I antibody levels as a screening procedure to identify those at high risk of developing leprosy is unlikely to be particularly useful in most leprosy control programs. Such assays may be useful for the epidemiological monitoring of changes in the intensity of infection with M. leprae in a community and for the study of carefully defined groups of contacts during some phases of control programs.

CARTEL, J.L. et. al. Chemoprophylaxis of Leprosy with a Single Dose of 25 mg per kg Rifampin in the Southern Marquesas. Results after Four Years. *Int.J.Lepr.,60(3),* p.416-420, 1992.

In January-February 1988, a program of chemoprophylaxis for leprosy, using a single 25 mg/kg dose of rifampin, was conducted among 2786 (98.7%) inhabitants of the Southern Marquesas and 3144 South Marquesan "emigrants" and their families. Among the treated population, during the 4 years which followed the implementation of the program, two leprosy patients were detected, one of whom can be considered as a failure of chemoprophylaxis because she was not known by the leprosy control unit. During the same period (1988-1991), a decrease in detection rates for leprosy in the entire French Polynesian population has been observed, an event which makes the interpretation of these findings very difficult. Nevertheless, according to presently available data, the effectiveness of chemoprophylaxis with a single dose of 25 mg/kg rifampin is estimated to be about 40% to 50%. When considering not only the results of the present study but also the financial and logistic constraints raised by such a program, one is led to the conclusion that chemoprophylaxis, even with a single dose of rifampin, is not likely to become an effective component of leprosy control programs.

CHANTEAU, S. et. al. Assessment of the Diagnostic Value of the Native PGLTB1 its Synthetic Neoglycoconjugate PGLTBO and the Sulfolipid IV Antigens for the Serodiagnosis of Tuberculosis. *Int.J.Lepr.,60(1),* p,1-7, 1992.

A major phenolic glycolipid (PGLTB1) from Mycobacterium tuberculosis, that resembles the phenolic glycolipid-I (PGL-I) from M. leprae, and Its synthetic terminal diglycosyl conjugate (PGLTBO) were reported and raised the prospects of a specific serodiagnostic test for tuberculosis (TB). The diagnostic use of a sulfolipid, namely the SLIV, was also reported. The objective of this investigation was to assess the relative sensitivity,

specificity, and predictive values of three ELISAs using the PGLTB1, the PGLTBO, and the SLIV as antigens for the serodiagnosis of TB. Similarly to leprosy patients for the PGL-I antigen, the TB patients responded preferentially in IgM against the phenolic glycolipid. We screened the sera from 191 active tuberculous patients, 29 healthy subjects living in France, 102 healthy Polynesian blood donors, 82 contacts of new TB patients, and 20 leprosy patients before treatment for IgG anti-SLIV, and for IgM anti-PGLTB1 and IgM anti-PGLTBO. TB patients showed significantly higher activity than did healthy Polynesians when tested against SLIV and PGLTBO, and the smear-positive group gave higher activity than did the smear-negative but culture-positive group, especially for IgG anti-SLIV. The leprosy patients did not show higher activity than the Polynesian controls. Respectively, for SLIV, PGLTB1 and PGLTBO antigens, the specificities were of 95%, 85%, and 89%; the sensitivities of 36%, 16% and 15%; the efficiencies of 58%, 40% and 39%; the predictive values for a positive result, assuming a prevalence of 15% among patients with respiratory symptoms, were of 30%, 16% and 19%.

CHATTER JEE, B.R. Leprosy immunopathogenesis and vaccine development. *Ind.J.Lepr.,64(3),* p.359-374, 1992.

The truly effective immunity against intracellular parasites, including mycobacteria, is mediated by monocyte/macrophages, and in the immunologically responding (resistant) host these phagocytes need minimal antigenic stimulus, specific or non-specific, to become activated and be microbicidal. T-cell mediated delayed hypersensitivity (DTH) causes tissue damage and destruction, which is particularly unwelcome in leprosy because of its nerve-damaging potential. Gamma interferon (INF-y), the terminal lymphokine of a DTH response, promotes mycobacterial survival and growth. There are T-cells (TH1 subtypes) that produce DH response either Independent of, or, only partly dependent on INF-y, this type of DH peaking at 24 hours appears similar to the Jones-Mote type rather than to the Tuberculin type of DTH peaking at 48-72 hours and is devoid of the necrotic component of tuberculbin type of DTH. M. leprae antigens normally elicit this Jones-Mote type of DH. SupprssorT-cells are associated with a protective immune response, while helper T- cells mediating DTH are harmful. In view of this immunobiology, it would appear that pathogenic mycobacteria that generate atuberculin type DTH response should not be used as immunogens in leprosy.

CHO, S.N. et. al. Prevalence of IgM antibodies to phenolic glycolipid I among household contacts and controls in Korea and the Philippines. *Lepr.Rev.,63(1),* p. 12-20, 1992.

Phenolic glycolipid I (PGL-I) is a Mycobacterium leprae-specific antigen and the antibodies to the antigen may suggest an M. leprae infection. To compare the M. leprae transmission among the populations, we compared the prevalence of anti-PGL-I IgM antibodies among household contacts and controls between Korea and the Philippines. In Korea (prevalence of leprosy 0.04:1000), the prevalence of anti-PGL-I antibodies were 4.8% among controls and 8% among contacts, respectively. On the other hand, the seroprevalence rate was 10.8% among controls and 13.4% among contacts in the Philippines (prevalence of leprosy - 0.70:1000). Interestingly, a marked difference was noted in the prevalence of anti-PGL-I antibodies among children between the countries; 10-14% among children under 10 years old and 1518% among those aged between 10 and 19 in the Philippines compared to 0% and 2.9-6.4% in Korea, respectively. This study, therefore suggests that a high prevalence of anti-PGLI IgM antibodies among children may indicate an active transmission of M. leprae, resulting in a higher incidence of leprosy in the population.

DAVID, H.L. et. al. Relationships Between Titers of Antibodies Immunoreacting Against Glycolipid Antigens from Mycobacterium leprae and M.tuberculosis, the Mitsuda and Mantoux Reactions, and Bacteriological Loads: Implications in the Pathogenesis, Epidemiology and Serodiagnosis of Leprosy and Tuberculosis. *Int J. Lepr.,60(*2), p.208-224, 1992.

Analysis of cell-mediated immunity [(CMI) as judged from the Mantoux, Fernandez, and Mitsuda reactions and the presence of granulomas in biopsy material)] against humoral immunity (measurements of anti-PGL-I, PGL-Tb1, and SL-IV IgG and IgM antibody titers by ELISA) were performed in selected human populations. The investigations yielded data indicating that humoral (B-cell) responses preceded protective CMI in both tuberculosis and leprosy. The B-cell responses were unrelated to (unfavorable) cell-mediated delayed type hypersensitivity (DTH). Notwithstanding the difficulty inferring sequential events from studies in humans, it was shown that in humoral responses there was an initial rise of specific IgM immunoglobulins that switched afterward to IgG production during subclinical tuberculosis and leprosy infections. In patent tuberculosis disease the IgM-to-IgG switch was observed in the majority of patients; in patent leprosy disease the switch was impaired in the majority of patients. The clinical, immunological, and laboratory data indicated that the B-cell responses were suppressed as protective CMI was re-established in the patients during the protracted subclinical infection. According to the data, the diagnosis of subclinical tuberculosis and leprosy may be accomplished using ELISA. The yearly risk of tuberculosis In apparently healthy persons but with significant antibody titers was estimated at 44%; the yearly risk for leprosy has not yet been established. The clinical, epidemiologic, and diagnostic implications of these findings are discussed.

DOUGLAS, J.T. et. al. Evaluation of four semi-synthetic *Mycobacterium leprae* antigens with sera from healthy populations in endemic and non-endemic areas. Leprosy Review 63(3), p. 199-210, 1992.

In order to determine the frequency of occurence of antibodies to semisynthetic antigens of Mycobacterium leprae in clinically healthy nonpatient populations and to establish a 'baseline' for comparison with antibody frequencies in both patients with a history of leprosy and their contacts, ELISAs were conducted using representative sera from two areas: a leprosy endemic area, Cebu City, Philippines and a nonendemic area for leprosy Chicago, Illinois, USA. These sera were tested, by an indirect IgM ELISA, for the presence of antibodies reacting with four semisynthetic antigens based on the phenolic glycolipid I antigen of M. leprae: ND-O-BSA (natural disaccharide with octyl linkage to bovine serum albumin), NT-0-BSA (natural trisaccharide with octyl linkage to BSA), ND-P-BSA (natural disaccharide with phenolic ring linkage to BSA) and NT-P-BSA (natural trisaccharide with phenolic ring linkage to BSA). Using an OD reading z 0.16 as positive, the antigen with the lowest background seroreactivity was ND-O-BSA, which reacted with 5/398 (1.3%) sera from Cebu, and 3/426 (0.7%) sera from Chicago. A total of 10 (2.5%) of 398 sera from the endemic area reacted with at least one antigen and 5 (1.3%) sera reacted with all four semisynthetic antigens. Of the 426 sera from Chicago, 12 (2.8%) were reactive with at least one antigen and 3 (0.7%) were reactive with all four semisynthetic antigens. Mean ELISA values for the 22 positive sera for each antigen ranged from 0.17 to 0.3 OD units, while the mean values for all sera in each area ranged from 0.01 to 0.04 OD units for all four antigens. Reactivity of 14 of the positive sera to some antigens, but not all four semisynthetic antigens, indicated that the carrier and linker arms might be associated with this background reactivity. Investigation of alternative linker arms and carriers is warranted. We conclude that nonspecific background reactivity to the semisynthetic antigens representing the PG-I molecule of M. leprae is 0.7-1.3%, based on a > 016 OD cutoff value. From these data It was concluded that reactivity in individuals free of leprosy was low enough to warrant use of these antigens in a diagnostic setting, such as screening

household contacts and highly endemic populations. When incidence and prevalence of leprosy are low, testing with these antigens would not be cost effective, unless applied to high risk individuals. Serological screening with these antigens might be useful in detecting and differentiating bacteriological relapse, type 1 or 2 reactions, early detection of leprosy, and monitoring treatment in endemic areas.

GULLE, H. et. al. T-Cell Responses of Leprosy Patients and Healthy Contacts Toward Separeted Protein Antigens of Mycobacterium leprae. Int.J.Lepr., 60(1), p.44-53, 1992.

Sonicated extracts of *Mycobacterium leprae* were separated by two-dimensional gel electrophoresis and electroeluted into 400 distinctsolublefractions. These fractions were probed with T lymphocytes from leprosy patients of different disease types, healthy contacts, and unexposed healthy individuals: Proliferative responses were visualized using three-dimensional stimulation profiles. T cells from many patients and contacts responded to a multitude of antigen fractions of different molecular masses and isoelectric points. T cells from unexposed individuals gave significant responses to lysates or whole organisms of *M. leprae,* but no or only marginal responses to separated antigen fractions. T cells of polar tuberculoid (TT) and the majority of polar lepromatous (LL) leprosy patients responded only to separated antigen fractions but not to lysates or whole organisms of *M. leprae.* The remaining LL patients were totally unresponsive and even failed to respond to separated *M. leprae* fractions. Thus, in some leprosy patients unresponsiveness to *M. leprae* seems to be caused by distinct components and can be broken by using separated antigen fractions; whereas in others, anergy remains. T cells of borderline tuberculoid (BT) patients, who were tinder chemotherapy, responded to separated antigen fractions as well as to lysates of *M. leprae* organisms. In contrast, BT patients who were untreated failed to react with any of the *M. leprae* preparations. Similarly, T cells of the majority of LL patients responding to separated fractions were under chemotherapy; whereas T cells from untreated LL patients gave no or only marginal responses to any of the *M. leprae* antigen preparations. These findings suggest some linkage between the degree of T-cell responsiveness and antileprosy drug treatment.

GUPTE, M.D. et. al. Effect of Skin Test with M. leprae Soluble Antigen on Reaction to a Subsequent Test with the Same Antigen. Int J.Lepr., 60(1), p.54-60, 1992.

Soluble skin-test antigens (STA), produced from armadillo-derived *Mycobacterium leprae* by Drs. Rees and Convit, were expected to meet the long-felt need of a test for leprosy infection and also to serve as tests for measuring postvaccination sensitization induced by vaccine preparations against leprosy. The present paper reports results from two studies examining the influence, if any, of skin testing with Rees' STA on reaction to a subsequent test with the same antigen.

In the first study, 2168 persons from households of leprosy patients and from neighboring households were skin tested with Rees' STA twice at an interval of 6 months. In the second study, 1700 persons, free from leprosy, received either Rees' STA or normal saline by random allocation. A random subset of 850 persons was tested with Rees' STA after 3 months. The remaining 850 persons were tested with Rees' STA after 6 months. In addition, 242 leprosy patients were given Rees' STA or normal saline by random allocation, and all of these patients were tested with Rees' STA after 6 months.

The results of the two studies showed that among persons reacting with a small size of reaction to Rees' STA, the size of the reaction to the repeat test was significantly larger. However, from the results of the second study, which included a control group, it was clearly seen that the quantum of boosting or sensitizing effect of the first test as well as that of new sensitization was small over a period of 3-6 months. Thus, the significant increase in reaction size to the second test among those with a small-size reaction to the

first test was mostly due to the design effect and was not attributable to the STA.

In view of the finding that even without any intervention, reactions to a repeat test would be much larger among those with a small-size reaction to the first test, it becomes important while designing studies for measuring postvaccination sensitivitythat provision be made for a control group to ensure a direct measure of the effect of a vaccine.

GUPTE, M.D. et. al. Sensitization Potential and Reactogenicity of BCG with and without Various Doses of Killed *Mycobacterium leprae. Int.J.Lepr., 60(3),* p.340-352,1992.

A study was conducted in 997 individuals in two villages in south India to find the acceptability and sensitizing effect of the antileprosy combination vaccine of BCG plus killed Mycobacterium leprae (KML). Three preparations of the combination, BCG 0.1 mg + 6 x 108 KML (I), BCG 0.1 mg + 5 x 10^7 KML (II), and BCG 0.1 mg + 5 x 10^6 KML (Ill), along with BCG 0.1 mg (IV), and normal saline (V), were used in the study. Each individual received one of the above five preparations by random allocation. They were also tested with Rees' M. leprae soluble skin-test antigen (MLSA) and lepromin-A, both at intake and 12 weeks after vaccination. Reactions to Rees' MLSA were measured after48 hr, those to lepromin-A after 48 hr and 3 weeks. The character and size of the local response at the vaccination site were recorded at 3, 8,12,15, and 27 weeks after vaccination.

The mean sizes of postvaccination sensitization to both Rees' MLSA and lepromin A in the vaccine groups were significantly larger than those in the normal saline group, clearly demonstrating the ability of the vaccines to induce sensitization as measured by responses to the two skin tests. The sensitizing effect was the highest following vaccination with vaccine I. It was not significantly different for vaccines Il, Ill, and IV, although, generally, a dose-response effect was observed. The sensitizing effect attributable to the vaccine was more clearly seen In children than in adults. The above conclusions were the same irrespective of which results were considered, reactions to Rees' MLSA or Fernandez or Mitsuda reactions to lepromin-A. A significant finding of the study was that at intake the Mitsuda reactions provided a measure of sensitizing effect due to vaccine

The healing of vaccination lesions was uneventful. In more than 90% of vaccinated individuals, the lesions had healed by the 12th week in vaccine groups II, Ill, and IV, and by the 15th week in vaccine group I. The results showed that vaccination with BCG or combination vaccines was equally safe in individuals with or without previous BCG scars: Thirteen persons, aged 10 years or older, developed suppurative lymphadenitis around the 8th week (7 in vaccine group I, 3 each in vaccine groups II and Ill). However, healing was prompt after drainage in these individuals.

HUSSAIN, R. et. al. Recognition of *Mycobacterium leprae.* Recombinant 18-kDA Proteins in Leprosy. *Int. J.Lepr.,60(3),* p. 368-375, 1992.

Three different, purified, Escherichia coli derived, recombinant preparations of the Mycobacterium leprae 18K protein were compared for their immunological recognition in leprosy. The preparations tested were 18K fusion proteins containing 70% (amino acids 38-148) of the full 18K protein fused to either a short leader sequence containing six asparagine residues or to B galactosidase, and the full length 18K protein. All three recombinant antigens were recognized by IgG antibodies which were restricted mostly to lepromatous leprosy patients. The 18K antigen with the asparagine leader sequence showed better reactivity with IgG antibodies compared with the other two 18K preparations. In lymphocyte proliferation assays, the truncated 18K and the full-length 18K showed equivalent responses in the same donors with strongest recognition in donors who were also strongly responsive to the M. leprae soluble sonicate. These results indicate that the major human B- and T-cell epitopes are located within the segment 38-148, although some individuals may recognize additional epitopes at the NH_2-terminal end.

KHAN, M.B. et. al. Sero-Immunoreactivity of Cloned Protein Antigens of *Mycobacterium leprae. Int.J.Lepr., 60(2),* p.195-200, 1992.

Sera from 173 leprosy patients with various types of disease (tuberculoid=TT, borderline tuberculoid=BT, borderline lepromatous=BL, and lepromatous=LL), 12 intrafamilial contacts, and 40 normal healthy individuals were assayed in an indirect enzyme-linked immunosorbent assay (ELISA) using Mycobacterium leprae antigens. Recombinant ciones carrying M. leprae antigens, namely, Y3184 (12 kDa), Y3179 (18 kDa), Y3164 (28 kDa), Y3180 (36 kDa), and Y3178 (65 kDa) and a cell sonicate from armadillo-derived M. leprae were used for the study. A high degree of reactivity with the 65-kDa, 36-kDa, and 28-kDa protein lysates was observed in most of the sera from multibacillary patients, with a low degree of positivity with 18 kDa and 12kDa. Only a few sera from paucibacillary patients showed positive reactions. The majority of the contact's sera tested showed no reactivity with these antigens.

KANCHANA, M.V. et. al. An appraisal of enzyme linked immunosorbent assay (ELISA) and serum antibody competition test (SACI) in leprosy. *Ind.J.Lepr., 64(1),* p. 42-50, 1992.

Seventy-eight untreated leprosy patients, 104 treated patients and 105 healthy contacts were tested using two serological tests, SACT (serum antibody competition test based on competitive inhibition of monocional antibody binding to the MY2a determinant of *M.leprae*) and ELISA (measurement of IgM antibodies to the neoglycoproteins D-BSA and ND-BSA representing the phenolic-glycolipid antigen of M. leprae). The controls included normal healthy individuals, patients with sputum positive pulmonary tubercu losis, and active cases of rheumatoid arthritis from the department of rheumatology. The specificity of SACT was found to be very high. ELISA was found to be positive in two patients with rheumatoid arthritis, one each for D-BSA and ND-BSA ELISA.

Both tests had a high sensitivity in BL and lepromatous patients. The sensitivity to both tests was considerably lower in tuberculoid and BT patients i.e., below 40%. Therefore the diagnostic value of a negative test in suspected cases of leprosy was very low employing either of the two tests. A proportion of patients with paucibacillary tuberculoid and BT leprosy were positive after six months or longer after therapy. Similarly a large number of BL and lepromatous patients were positive after considerable longer periods of treatment. The use of either tests for determining the duration of therapy is therefore limited. SACI appears to be more sensitive than ELISA with ND- BSA in detecting subclinical infection. The cumulative positivity of the two tests may be used as a measure of the infectivity of the disease in the community and for evaluating disease control methods.

KAR, H.K. et. al. Induction of lepromin positivity by a candidate anti-leprosy vaccine mycobacterium w in lepromin negative healthy contacts of multibacillary leprosy patients. *Ind.J.Lepr., 64(4),* p. 495-500, 1992.

In a hospital based study, 362 household contacts of multibacillary leprosy patients were screened for evidence of leprosy and 54 (14.9%) were found to be having leprosy. The remaining 308 apparently healthy contacts were lepromin tested and 109 (35.4%) were observed to be negative to Mitsuda lepromin. M.w vaccine was administered intradermally to 95 of these 109 lepromin negative contacts. Sixty eight of them could be retested for lepromin A reactivity. Fifty six (82.35%) manifested lepromin conversion. The twelve subjects who did not show lepromin conversion, received a second dose of the vaccine, and eleven subsequently became lepromin positive. The overall lepromin conversion rate was thus 98.5% (67 out of 68). Follow-up of these contacts upto a period of 30 months did not demonstrate reversion of lepromin positivity back to negativity status. No untoward effects of vaccination were observed except for local ulceration at the site of vaccine administration.

KASHYAP, A. et. al. Delayed Clearance of Circulating Immune Complexes in Mice Following Administration of Antileprosy Drugs. *Int.J.Lepr., 60(3),* p.404-409, 1992.

In this report we describe an animal experiment which showed delayed clearance of preformed ^{125}I-HSA-anti-HSA immune complexes (with five times excess HSA) from the circulation of mice treated with antileprosy drugs (dapsone, ciofazimine, and rifampin - multidrug therapy for 7 days) in comparison with normal (untreated) mice. The results also showed delayed retention of the preformed immune complexes in the spleen and kidneys of the antileprosy-drug-treated animals. The exact mechanism of the delayed handling of preformed immune complexes in mice fed antileprosy drugs could not be ascertained. However, in light of the anticomplementary effects of clofazimine and dapsone, as reported earlier, and in light of the large accumulation of ciofazimine and rifampin in macrophages, it has been postulated that in the drug-fed animals either the immune complexes could not be phagocytosed by macrophages, through the avenue of their C3b receptors, or the immune complexes could not be downgraded easily within the macrophages overloaded with clofazimine and rifampin. These results might have clinical significance and might throw some light on the prolonged persistence of circulating immune complexes in the vascular bed of lepromatous patients even after clinical remission of *erythema nodosum leprosum.*

LASZLO, A. et. al. Comparison of Bisdioctadecylamide of Trehalose Dicarboxylic Acid (BDA-TDA) with Glycolipid SL-IV as ELISA Antigens for the Serodiagnosis of Leprosy. *Int.J.Lepr., 60(3),* p. 376-381, 1992.

Two glycolipids-one synthetic and nonnatural (BDA.TDA), the other natural and *Mycobacterium tuberculosis species-specific* (SL-IV) - were tested to determine their serological activity in sera obtained from leprosy patients, and to determine their discriminating ability in the detection of disease. The ELISA results obtained in the IgG antibody class show that both were useful substances capable of detecting multibacillary and paucibacillary disease in about 2 out of 3 leprosy patients. When these antigens were tested in parallel, the sensitivity of the ELISA test was increased by 10% without a decrease in specificity.

LAUNOIS, P. et. al. Human Phagocyte Respiratory Burst by *Mycobacterium bovis* BCG and *M. leprae:* Functional Activation by BCG is mediated by Complement and its Receptors on monocytes. *Int.J.Lepr., 60(2),* p. 225-233, 1992.

We have measured the role of serum components on two parameters of the phagocytosis reaction: a) the chemiluminescence (CL) response associated with the oxidative respiratory burst in response to *Mycobacterium bovis* BCG and *M. leprae,* and b) the uptake of these two mycobacteria by healthy human monocytes. Pre-incubations of fresh or heat-inactivated serum or serum containing EGTA or EDTA indicate that these two mycobacteria activate the altemative complement pathway. Monocional antibodies against CR 1 and CR3 inhibit the responses of *M. bovis* BCG and *M. leprae,* demonstrating that complement receptors mediate the phagocytosis of these two mycobacteria. Thus, complement and its receptors on the surface of the monocytes (CR 1 and CR3) are Important in the functional activation of phagocytosis of M. bovis BCG and M. leprae.

MAHAJAN, P. et. al. Gelatin particle agglutination assay to detect anti-PGL-I antibodies in leprosy patients and in household contacts: A preliminary study. *Ind.J.Lepr., 64(4),* p. 461-467, 1992.

A preliminary study of anti-phenolic glycolipid-I (PGL-I) IgM antibody detection using M. leprae gelatin particle agglutination (MLPA) test kit is described. Antibodies were demonstrated in 70% of our leprosy patients taking antileprosy treatment. The percentage of positivity of

multibacillary cases was 86.0, whereas that of paucibacillary cases was 30.0. Good correlation was found between bacteriological index and the presence of antibodies. Antibodies were detected in 28% of our patients released from treatment. Fourteen out of 27 household contacts were found to have antibodies but none of the normal controls were seropositive. These preliminary data demonstrage that MLPA test is not applicable as sero-diagnostic test or as a test of cure, but may be useful for epidemiological studies and as a research tool.

MULLINS, R.J. et. al. Serological Response to Purified Mycobacterial Phosphatidylinositol Mannoside in Healthy Controls and In Patients with Tuberculosis and Leprosy. Int.J.Lepr. 60(3), p. 353-367, 1992.

The serological response to a monoclonal antibody-defined phosphatidylinositol mannoside (L4-PIM) present in all mycobacteria was examined in patients with various mycobacterial diseases and healthy subjects from different populations. IgG but not IgM antibodies were detected in most patients with untreated lepromatous (84%) or borderline lepromatous (65%) leprosy, but in only a minority of those with disease at the tuberculoid end of the leprosy spectrum (<17% positive). The response to L4PIM was correlated with the IgM response to disaccharide octyl-bovine serum albumin (dBSA), and decreased with successful treatment. On the other hand, the test proved to be of little value in the diagnosis of untreated tuberculosis (4/15 positive) or atypical mycobacterial infection in patients with AIDS (0/11 positive). IgG antibodies to L4PIM were also found in a significant proportion of healthy individuals, irrespective of their Mantoux status. These antibodies were shown to be specific for L4-PIM on immunoblotting, and their incidence Increased with age in random donors from both urban Australia and rural Papua New Guinea. Despite the limited value of the assay in diagnosis of any particular mycobacterial disease, the presence of antibodies to L4-PIM appears to be a sensitive indicator of subclinical infection with environmental mycobacteria In subjects with an Intact immune system.

NAVALKAR, R.G. et. al. Enzyme Linked immunosorbent Assay of 12-kDA Protein of *Mycobacterium leprae* with Sera from Leprosy Patients. Int.J.Lepr., 60(3), p. 382-389, 1992.

A low molecular weight protein was obtained from a sonicate of armadillo-derived Mycobacterium leprae cells and from a λgt11 phage lysate of *Escherichia* coli(specifying the *M. leprae* 12-kDa protein) by a single step of ultrafiltration. Both proteins had an approximate molecularweight of about 12,000 (by SDS-PAGE) and were recognized by the M. leprae 12-kDa-specific monoclonal antibody ML06 by imunoblotting. Sera from 79 leprosy patients across the clinical spectrum, 17 contacts, and 12 normal healthy individuals were screened in an enzyme-linked immunosorbent assay (ELISA) using the 12-kDa proteins as the antigens. Antibodies to the 12-kDa protein (from lysate as well as sonicate) were detected in patients' sera across the clinical spectrum (44% - 100% positivity), while no detectable reactivity was observed with control or contact sera. Sera from patients who had undergone a year or more of chemotherapy exhibited no reactivity compared to those from patients with only 3-6 months of chemotherapy. The 12-kDa proteins were also recognized by rabbit hyperimmune *M. leprae* antiserum.

REDDY, B.S.N. et. ai. Utility of gelatin particle agglutination test (MLPA) for rapid serodiagnosis of leprosy in a hyperendemic area. *Ind.J.Lepr., 64(4),* p. 469-474, 1992.

The anti-PGL *M./eprae* specific antibodies were estimated by MLPA test In 79 patients of leprosy, 8 contacts of lepromatous cases and 10 healthy controls in a hyperendemic area. The results indicated an overall seropositivity of 50.6% in leprosy patients. Three of the eight contacts and five of the controls also gave positive results. Higher seropositivity rates were noted in multibacillarypatients (73% in lepromatous, 53.6%

in borderline, 40% each in tuberculoid and Indeterminate and 10% in pure neuritic types). The practical application of MLPA test in its present form as a serodiagnostic procedure for screening subclinical or clinical infections in leprosy patients appear to be of limited value in hyperendemic areas. Further studies involving large series of subjects are necessary for reaching definite conclusions.

ROCHE, P.W. et. al. Antibody Responses to the 18-kDA Protein of *Mycobacterium leprae* in Leprosy and Tuberculosis Patients. *Int.J.Lepr., 60(2),* p. 201-207, 1992.

The 18-kDa protein of *Mycobacterium leprae,* as recognized by the monoclonal antibody L5, has a restricted species distribution, being confined to M. *leprae* and *M. habana. We* have developed a solid-phase ELISA using purified, recombinant *M. leprae* 18-kDa protein and compared the serological responses of Nepali leprosy and tuberculosis patients and endemic control subjects to the protein and the *M. leprae* phenolic glycolipid-I (PGL-I). Few control subjects had anti-18-kDa antibodies. A small proportion of paucibacillary (PB) leprosy and 42% of multibacillary (MB) leprosy patients had IgG anti-*M. leprae* antibodies. A similar proportion (47%) of Nepali tuberculosis (TB) patients were seropositive, and IgG anti-18-kDa antibody levels were significantly higher in MB and TB patients than in control subjects. By comparison, IgM anti-PGL-I antibodies were detected in 88% of MB leprosy patients and only 7% of TB patients. The possible reasons for the 18-kDa protein seroreactivity in TB patients are discussed, and the anti-18-kDa assay Is compared with other antibody assays for protein and nonprotein antigens of *M. leprae.* It is concluded that the sensitivity and specificity of the anti-M. *leprae* 18-kDa ELISA are insufficient for the assay to be of clinical utility in leprosy patients.

ROCHE, P.W. et. al. Cellular Immune Responses to Mycobacterial Heat Shock Proteins in Nepali Leprosy Patients and Controls. *Int.J.Lepr. 60(1),* p. 36-43, 1992.

Sixty-three leprosy patients, representing the entire leprosy spectrum from tuberculoid to lepromatous disease, and 17 healthy Nepali subjects were tested for their T-cell responses to the purified p65 and p70 protein antigens of Mycobacterium bovis BCG using a lymphocyte proliferative assay There was strong correlation between the responses to BCG and *M. leprae* and the responses to the two antigens. Patients and controls lacking a response to either of the whole cell preparations failed to respond to the purified antigens, while BCG responders atthe lepromatous pole of the disease did mount a response to both antigens. Significant differences in the magnitude of the responses to these antigens were obtained between controls and the disease groups. In individual subjects, responses to the two antigens were significantly correlated to each other.

RODRIGUES, M.L.O. et. al. Protective Effect of Intradermal BCG Against Leprosy; a Case-control Study in Central Brazil. *Int.J.Lepr., 60(3),* p. 335-339, 1992.

A case-control study was undertaken to evaluate the protective efficacy of intradermal BCG against leprosy in a high-endemic area of leprosy in central Brazil. Sixty-two cases and 186 controls were included in the study. Cases were all newly diagnosed leprosy patients under 16 years of age attending an outpatient health service, and all of them were schoolchildren. Three controls under 16 years old, frequency matched by sex and age group, were selected from schools geographically located in the area from which the cases came. The presence of BCG was negatively associated with leprosy, indicating a 5.3 risk of leprosy for those nonvaccinated and protective efficacy of 81%. Paucibacillary patients were more likely to have a BCG scar then multibacillary patients.

SEKAR, B. & ANANDAN, D. Evaluation of *Mycobacterium leprae* particle agglutination test, using eluates of filter paper blood spots. *Leprosy Review 63(2),* p. 117-124, 1992.

A comparison of the ELISA test with newly-developed MLPA test was carried out, using eluates of blood spots from filter paper for the detection of the anti-PGL-I antibody. A very good positive correlation was observed between these two tests. The concordance rate was found to be 92.6%, ranging from 71.4% to 100%. This nonconcordance was not found when freshly-collected samples were used. The MLPA test is simple and reliable. The use of eluates from bloods spots collected on filter paper further simplifies the test in the collection and transportation of blood samples. This accurate and rapid method makes the MLPA test logistically feasible for large-scale screening. With our modification of MLPA with eluates more samples can be screened with the kit than with sera.

SHARMA, V.K. et. al. Detection of a *Mycobacterium leprae* cell wall antigen in the urine of untreated and treated patients. *Lepr. Rev., 63(1),* p. 28-35, 1992.

A total of 90 leprosy patients, 12 *houlsehold* contacts and 10 normal subjects were studied for the detection of *Mycobacterium leprae* cell wall antigen in urine using monocional antibody ($ML3OA_2IgG$). In untreated multibacillary leprosy (BL-LL) the *M. leprae* cell wall antigen could be demonstrated in the urine of 14 (64%) patients by immunofluorescence (IF) and 22 (100%) by ELISA. In untreated paucibacillary leprosy (TT-BT), it could be demonstrated in 3 (11.5%) and in 13 (50%) patients by IF and ELISA methods respectively. All but I household contact (later confirmed to have BL leprosy) and all 10 normal subjects'urine was negative for *M. leprae* cell wall antigen by both methods. The same antigen was, however, demonstrated in urine of 50% paucibacillary patients who had received 6 months of treatment and in 68% multibacillary patients who had received 24 months of WHO recommended multidrug therapy. *M. leprae* cell wall antigen assays in urine will not be usefull in the follow-up of leprosy patients on multidrug therapy.

SINHA, S. et. al. Analysis of Circulating Immune Complexes from Leprosy Patients for *Mycobacterium leprae Antigens. Int.J.Lepr., 60(3),* p. 396-403, 1992.

Circulating immune complexes (CICs) from 31 leprosy patients (16 tuberculoid, 15 lepromatous) and 12 healthy volunteers precipitated by 3.5% polyethylene glycol, were individually subjected to SDS-PAGE and immunoblotting using a variety of monoclonal and polyclonal antibodies against *Mycobacterium leprae.* A common mycobacterial antigen of an apparent molecular size of 65 kDa was identified in CICs from about 40% of the patients. No correlation was observed between the positivity for this antigen and any of the following parameters: bacterial index, M. leprae-specific antibody titers, motor nerve involvement, duration of disease or treatment. Nevertheless, patients with a relatively recent and massive infection were more frequently positive for antigen than the others.

S. RADA, E.M. et. al. Preliminary Study of Cellular Immunity to *Mycobacterium leprae* Protein in Contacts and Leprosy Patients. *Int.J.Lepr., 60(2),* p. 189-194, 1992.

Because of the good results obtained in the mononuclear cell (T lymphocyte) proliferative response in tuberculoid leprosy patients and family contacts and healthy Mitsuda-positive volunteers using *Mycobacterium leprae* soluble extract, we prepared different protein fractions from the soluble extract. We used the T-cell Western blot technique with separation by electrophoresis in SDS-polyacrylamide gels and transfer onto nitrocellulose membranes. Each unstained blot was converted into 18 fractions of antigen-bearing particles and tested with peripheral blood mononuclear cells from 21 individuals including Mitsuda - positive contacts, vaccinated

lepromatous leprosy (LL) patients, borderline tuberculoid (BT) patients, and unvaccinated lepromatous patients. The simulation index (SI) of the contacts was higher to the different fractions in comparison with the leprosy patients. They showed four peaks of stimulation to fractions 66-55, 45-29, 22-18, and 14 kDa. The second highest responders were BT patients, followed by vaccinated LL patients. The unvaccinated patients did not respond significantly to any of the fractions (SI<1).

40 slit nad scrape smears in a planned study and 35 routine smears picked up from the laboratory were examined. An end-to-end examination of the smears detected additional positives and gave a higher bacterial index than what was reported in the routine. Acid-fast bacilli were found to be distributed in only 1 to 3 per cent of the fields in the smears. The bacilli were found mostly in the centre and in narrow bands between centre and periphery of the smears. Some of the high BI smears were found to contain areas completely free from bacilli.

MICROBIOLOGIA

BASKIN, G.B. et. al. Pathology of Dual *Mycobacterium leprae* and Simian Immunodeficiency Virus Infection in Rhesus Monkeys. *Int.J.Lepr., 58(2),* p. 358-364, 1990.

Three rhesus monkeys were experimentally inoculated with sooty-mangabey-derived *Mycobacterium leprae* and were inadvertently infected with the simian immunodeficiency virus (SIV) as well. They died of an immunodeficiency syndrome, and at autopsy all had lesions caused by *M. leprae.* One monkey was inoculated twice with *M. leprae,* initially with an inoculum from a sooty mangabey that was not infected with SIV and, subsequently, with an inoculum from a mangabey that was SIV infected. The monkey did not develop clinical lesions and became strongly lepromin skin test (LST) positive after the first inoculation, but became infected with both agents and LST negative following the second inoculation. These observations suggest that SIV-in-fected rhesus monkeys have an increased susceptibility to *M. leprae* infection and, by analogy, imply that HIV-infected human beings may have an increased susceptibility as well.

BHATIA, V.N. et. al. Some observations on skin smear examination. *Ind.J.Lepr., 62(3),* p. 338-345, 1990.

CHAKRABARTY, A.N. et. al. Cultivation in vitro of acid-fast nocardioform chemo-autotrophic bacteria from mouse foot-pads infected with human strain of leprosy bacillus. *Ind.J.Lepr., 62(2),* p. 169-179, 1990.

Four acid-fast nocardioform bacteria could be isolated and cultivated as pure cultures in vitro from mouse foot-pads (MFP), wich were infected with serially passaged strains of human leprosy bacillus; the liquid mineral medium, such as paraffin urea minimal (PUM), paraffin gelatin minimal (PGM), gelatin minimal (GM), and GM agar (GMA) slants containing only simple sources of C and N were used, just like the human and the armadillo isolates of these organisms reported earlier. Morphologically, metabolically and enzymologically, these were ciosely related to the previous ones and were also chemoautotrophic in nature. Serologically there appears to be a heterogenicity in these isolates, i.e., some of them showing higher affinity to nocardio forms while others showing siginificant binding to several mycobacteria. Normal (uninfected) mouse foot- pad harvests were not found to harbour such organisms.

IBRAHIM, M.A. et. al. Analysis of Variation in Batches of Armadillo-derived *Mycobacterium leprae* by Immunoblotting. *Int.J.Lepr., 58(1),* p. 73-77, 1990.

Several batches of cell-free extracts of armadillo-derived *Mycobacterium leprae* were

analyzed by SDS-PAGE and by immunoblotting with monoclonal antibodies. The presence or absence of protease inhibitors had a profound effect on the protein antigens, particularly the 65-kDa antigen. In the absence of protease inhibitors, there were both quantitative and qualitative differences between the different batches of *M. leprae* extracts.

KAZDA, J. et. al. Acid-Fast Bacilli Found in Sphagnum Vegetation of Coastal Norway Containing *Mycobacterium leprae-specific* Phenolic Glycolipid-l. *Int.J.Lepr., 58(2),* p. 353-357, 1990.

In the grey layer of sphagnum vegetation originating from the former leprosy-endemic regions of coastal Norway, acid-fast bacilli (AFB) containing *Mycobacterium* leprae-specific phenolic glycolipid (PGL-I) on the surface have been found These AFB survived in foot pads of nude mice with multiplication but without swelling. This contrasts to experimental leprosy with clinically derived *M. leprae* where swelling and unlimited multiplication takes place. The naturally occuring AFB may be of a lower pathogenicity than *M. leprae* obtained from clinical cases. The possibility of *M. leprae* surviving in sphagnum vegetation was assessed by inoculation of clinically derived *M. leprae* into the grey layer of the sphagnum. It multiplied more than tenfold and retained its pathogenicity in nude mice for 16 weeks, the duration of the experiment. The lack of pathogenicity of sphagnum-derived, M. leprae-like mycobacteria may be relevant to the decline of leprosy in Norway.

PAL, D. et. al. Is leprosy bacillus a chemo-autotrophic nocardioform organism? *lnd.J.Lepr, 62(3),* p. 351-357, 1990.

Numerous attempts at in vitro cultivation of the leprosy bacillus have all proved to be unsucessful. Recently, we have repeatedly Isolated chemo-autotrophic nocardioform (CAN) organisms in pure culture from multibacillary cases of leprosy. We find that these resemble the leprosy bacillus in many respects and suggest that the leprosy bacillus may be cioser to the genus Nocardia than to Mycobacterium, and that it may be a chemo-autotroph, requiring only simple sources of carbon and nitrogen for its growth. This is in contrast to most other human pathogens, wich are heterotrophs requiring complex sources of carbon and nitrogen for their growth. This could offer a possible explanation for the repeated failure at in vitro cultivation of the leprosy bacillus.

SILBAQ, F. et. al. The Disease of CBA and BALB/c Mice that Follows Inoculation of a small Number of *Mycobacterium lepraemurium* into the Hind Foot Pad. *lnt.J.Lepr., 58(4),* p. 681-689, 1990.

To learn if the lack of an immune response in mice infected with *Mycobacterium lepraemurium* (MLM) was a consequence of the organisms, we studied the disease that followed inoculation of 5 5000 organisms into the hind foot pads of CBA and BALB/c mice. The mice of booth strains demonstrated a rapid increase of bacterial numbers soon after inoculation, with a slowing of the rate of multiplication once the number of organisms per foot pad passed 3×10^7. By 1 year after inoculation, the numbers of organisms had reached levels $>10^{11}$ in the spleen and liver, and $>10^8$ in the femoral bone marrow. In mice that had been inoculated with as few as 5 MLM or 50 MLM, the organisms had multiplied to numbers $>10^8$ in the foot pads and to $>10^9$ in the spleens, suggesting that the ID^{50} of viable MLM may be <5 organisms per foot pad. No protection against superinfection could be demonstrated. On the other hand, initial multiplication of MLM in the foot pads was followed virtually immediately by the death of at least 97% of the organisms.

ABRAHAM, B. & CARIAPPA, A. Inter and Intra-- Laboratory Variation in the Reporting of Skin Smears in Leprosy. *lnt.J.Lepr., 59(1),* p. 76-81, 1991.

This paper defines the variations in the reporting of skin smears between a base and field

laboratory in a leprosy control program. Ten percent of all slides read by the field laboratory in a control area were re-read by the base laboratory. There was almost no variations in the reporting of negative slides, but a variation of 1 + was present in approximately 92% of positive slides. Thus, there was agreement in approximately 8% of positive slides. This paper also defines the variations in the reporting of positive slides under "ideal" conditions by describing the results of a study on intraand inter-observer variations among technicians at the base laboratory. There was between 45% and 55% agreement within observes and about 36% agreement between observers. The results of both studies are compared. Simple guidelines are derived to monitor the reporting of skin smears in leprosy control programs.

BANERJEE, Rita et. al. Transmission of viable *Mycobacterium leprae* by *Aedes aegypti* from lepromatous leprosy patients to the skin of mice through interrupted feeding. *Leprosy Review, 62(1),* p. 21-26, 1991.

Female Aedes aegypti which took partial blood meals from the skin lesions of untreated lepromatous leprosy (LL) patients were then allowed to continue feeding on 72-96-hr-old Swiss albino suckling mice (Rockefeller strain). The bitten portion of skin was removed, divided into two parts and processed for the extraction of bacilli by two different methods using chloroform and petroleum ether. The proboscis of some of the fed mosquitoes was dissected out and examined for viable bacilli (stained by fluorescein diacetate and ethidium bromide) and acid-fast bacilli (AFB). Out of 50 proboses dissected 45 were found positive for AFB, with bacillary counts ranging up to 246 (average 40.20 ± SD 41.80) per proboscis. The average percentage of viable bacilli (green solid) in the proboses immediately after feeding on LL patients was 43.90 and thereafter it decreased gradually to 3 on the seventh day. In the petroleum ether extract of mouse skin viable bacilli were observed in numbers up to 37 (average 15.25±SD 10.25) per smear. The number of fluorescing bacilli (green and red) correlated with the total number of AFB.

HEYING, W. et. al. The susceptibility testing of 13 strains of *Mycobacterium leprae to* rifampicin and the determination of minimal effective dosage. *Leprosy Review, 62(3),* p.276-279, 1991.

By use of the mouse footpad technique, the susceptibility testing of 13 strains of Mycobac terilum leprae to rifampicin (RFP) and the determination of minimal effective dosage (MED) were carried out. Among these strains of M. leprae, 8 were obtained from previously untreated multibacillary leprosy patients and 5 from relapsed leprosy patients and 5 from relapsed leprosy patients without using RFP previously. The results showed that the MED of all strains to RFP were 5 0.001% FRP in the diet, 5 strains being equal to 0.001%, 5<0.0001%, 2_> 0.0003% and 1<0.0003%. The results indicated that the MED value of RFP could be lower than that of other reports. Because the critical concentration of RFP for assessment of RFP resistant strains is not well established a further study would be worthwhile. The results of the determination of sera RFP concentration in mice administered the RFP diet were identical with that of Holmes'report. Five of the 13 strains also showed that the growth of bacilli were suppressed by 10 mg/kg RFP using the gavage method.

JAYAPAL, V. et. al. Fluorescein diacetate and ethidium bromide staining to determine the viability of *Mycobacterium smegmatis* and *Escherichia coli. Leprosy Review, 62(3),* p. 310-314, 1991.

The ability of the fluorescein diacetate and ethidium bromide fluorescent staining method to assess the percentage of viable bacterial cells in suspension was compared with the plate counting method *Mycobacterium smegmatis and Escherichia coli* bacterial cell suspensions were incubated at 60°C. At different time intervals samples were taken and the percentage of viable cells in each sample was assessed by the fluores - cent staining method and compared with the plate

counting method. The fluorescent staining method showed a positive correlation with the plate counting method. However, the viable counts by the plate counting method were lower than the staining method when incubated at 60°C, indicating a lag period in the decay of enzymes after bacterial death. Hence, the fluorescent staining technique can be used to asses the trend of bacterial death rather than to assess the exact number of viable bacilli.

PALOMINO, J.C. et. al. Assessing the viability of *Mycobacterium leprae* by the fluorescein diacetate/ethidium bromide staining technique. *Ind.J.Lepr., 63(2),* p. 203-208, 1991.

In the present study we have evaluated the Fluorescein Diacetate/Ethidium Bromide (FDA/EB) staining technique to assess the viability of *Mycobacterium leprae* obtained from biopsies of leprosy patients under different periods of treatment. Bacillary suspensions were obtained from skin punch biopsies and stained with the FDA/EB solution. The average percentage of green cells seen which were deemed to be viable were: 67.2% of green cells in patients without previous treatment; 45.6% in patients with 1 to 6 months of treatment; 25.9% for patients with 7 to 12 months of treatment and 10.5% in patients with 13 to 24 months of treatment. All the patients studied were on multidrug therapy. The differences obtained in the percentages of green cells in the different groups of patients were statistically significant as determined by the Wilcoxon's test. The decrease in the percentage of green cells observed with increasing periods of treatment suggests that the FDA/EB technique correlates with the actual viability of *M. leprae.* The application of this technique in the routine procedures performed with Hansen's disease patients could be very useful for monitoring the effectiveness of treatment in leprosy patients.

RASTOGI, N. et. al. Differential Handling of Bacterial Antigens in Macrophages Infected with *Mycobacterium leprae* as Studied by Immunogold Labeling of Ultrathin Sections. *Int J.Lepr., 59(2),* p. 278-291, 1991.

Mycobacterium leprae were purified from the livers of experimentally infected armadillos, and the purity of the bacterial preparation was established by electron microscopy, immunoelect-rophoresis of purified bacilli with rabbit serum raised against liver tissues from a noninfected aramdillo, and gas chromatografy. Such purified and intact bacilli were fixed and embedded by a gelatin-Lowicryl method for electron microscopy wich preserved in the mycobacterial antigens. Ultrathin sections were labeled with antisera raised in rabbits against the total antigens of the following species of mycobacteria: M. leprae, M. bovis BCG, M. avium, and a rapid-growing, nonpathogenic species, *M. fallax.* Bacteria were also labeled using serum raised against 2,3-diacyl-trehalose-2'-sulfate (sulfolipid-IV or SL_{IV},) isolated and purified from *M. tuberculosis.* The immunolabeling was visualized under the electron microscope (EM) by using a secondary probe (goat-antirabbit IgG, H+L, coupled to 5 nm gold particles; GAR-%). EM results showed that *M. leprae* bacilli were highly labeled with all of the antisera used except Sl_{IV}, which was present only in discrete amounts. All of the antisera used labeled the bacterial "capsule", showing that this structure was not an artifact since it contained mycobacterial antigens. In parallel experiments, the murine J-774 macrophage cell line was infected with purified *M. leprae* and fixed for EM at various time intervals for 1 week. Although the phagocytized bacteria did not multiply during the 1-week experiment, macrophages were unable to lyse them. Immunogold labeling of bacterial antigens in ultrathin sections of infected macrophages helped us to conclude: a) bacterial death and/or lysis is not a prerequisite for processing of antigens by infected macrophages; b) there was conclusive evidence for a differential antigen handling, i.e., some antigens were rapidly released (within 2 days, mostly capsular antigens) inside infected macrophages and transported to the macrophage surface, whereas others (the majority of them located in the cell-was skeleton and in deeper bacterial structures) remained unreleased even after 4 to 7 days of infection; c) although relatively fewer epitopes reacting with rapidly

released (within 2 days) inside macrophages, and exocytized to the macrophages surface. These novel findings are discussed in relation to leprosy and the current knowledge about the processing of bacterial antigens.

BHATIA, V.N. & RATHINAVEL, L. Isolation of a dopa positive rapid growing mycobacterium from blood of a leprosy patient. *Ind.J. Lepr., 64(1),* p. 88-90, 1992.

A rapid growing acid-fast organism was isolated from the blood of a borderline leprosy patient. The isolate appeared to be close to *Mycobacterium cheloni* group of orgnaisms but showed globi, cigar shaped bundies and was positive for DOPA-oxidase. Catalase, iron uptake, sodium chloride tolerance, tellurite reduction, Tween 80 hydrolysis and pyridine extraction tests were also positive. The 3-days arylsulphatase test and nitrate reduction test were negative.

HERBERT, D. & PRABHAKAR, R. Observations on the cultivation of *M. leprae* and *M. tuberculosis* in medium "V" and "V1". *Ind.J.Lepr.,* 64(3), p. 341-348, 1992.

Skin scrapings from five different active sites were collected from 14 leprosy patients and inoculated into medium V. Skin scrapings from three leprosy patients were inoculated into medium V 1. All the cultures were incubated at 810°C. M. tuberculosis $H_{37}Rv$, pretreatment isolates and streptomycin resistant strains were inoculated into medium V, with and without antibiotics, and incubated at 8-10°C as well as 37°C. Smears were made from the M. leprae and M. tuberculosis cultures at 0 hours and at different time points. The number of bacilli in the smears were counted. There was no increase In the number of M. leprae or M. tuberculosis in any of the cultures.

ISHAQUE, M. Energy Generation Mechanisms in the in Vitro - grown *Mycobacterium lepraemurium. lnt J.Lepr., 60(1),* p. 61-70, 1992.

Mycobacterium lepraemurium was cultivated on Ogawa egg-yolk medium and its energy coupling mechanisms were investigated. Cell-free extracts prepared from in vitro-grown cells catalyzed phosphorylation coupled to the oxidation of generated NADH, added NADH, and succinateyielding ratios of phosphorus moles incorporated into high-energy bonds to oxygen atoms utilized (WO ratios) of 0.75, 0.52, and 0.36, respectively. Ascorbate oxidation alone or in the presence of tetramethyl-p-phenyline-diamine (TMPD) did not yield any adenosine triphosphate (ATP). However, ascorbate in the presence of added cytochrome c was coupled to ATP synthesis and yielded a P/O ratio of 0.12. The oxidative phosphorylation was uncoupled by all of the uncouplers used without any inhibition of oxygen consumption. ATP generation coupled to NADH oxidation was completely inhibited by the flavoprotein inhibitors, such as rotenome and amytal; these inhibitors had no effect, however, on ATP synthesis associated with succinate oxidation. Antimycin A or 2-n-heptyl-4-hydroxy-quinolite-N-oxide (HQNO) and cyanide inhibited markedly the oxidations of NADH and succinate as well as the coupled ATP generation. The phosphorylation coupled to ascorbate plus cytochrome c was not affected by either of the flavoprotein inhibitors or by antimycin A or HQNO, but was completely inhibited by cyanide. The thiolbearing agents p-chloromercuribenzoate (PCBM) and N-ethylmaleimide were the potent inhibitors of the phosphorylation associated with the oxidation of NADH and succinate. The results indicate that the three energy-coupling sites are functional in the respiratory chain of in vitro-grown *M. lepraemurium.*

PAIN, S. et. al. On structural aspects of peptidoglycan of bacterial cell wall with special attention on mycobacteria by computer modelling. *Ind.J.Lepr., 64(1),* p. 28-41, 1992.

The cell wall components of mycobacteria are said to be vitally linked with their pathogenicity. Peptidoglycan, one of the major cell wall

component in most of the bacteria are multilayered in gram positive bacteria and it is diverse in nature for the Gram positive strain rather gram negative. The cell wall of bacteria are primary targets for many drugs and antibiotics and conformation of the major cell wall components provide invaluable information and understanding at molecular level to medicinal chemists and drug designers. mycobacterial peptidoglycan has been studied critically by computer modelling on various aspects. A plausible structure and conformation has been identified and glycan chain is found to have a pseudo two fold symmetry taking disaccharide unit as monomer with Knox & Murthy H-bond scheme. This paper attempts to clarify the understanding of organisation and possible interaction mode of peptidoglycan of organisation in complex mycobacterial cell wall structure.

PORICHHA, D. et. al. BI of patients vs BI of individual sites. Ind. J. Lepr., 64(2), p. 179-182, 1992.

An analysis of 200 skin smear results from multibacillary patients showed that the average bacteriological index (BI) of a patient varied considerably from his site-wise highest B I. The average BI was equal to site wise highest BI only in 17.5% of cases and in the rest, it ranged from 99% to as low as 36% of the highest site-wise BI. In folow-up smears, site-wise consistency of the highest BI was found in 96% of cases. It is suggested that for follow-up purposes, repeating smear from only one such site would be adequate.

SHANNON, E.J. et. al. Competency of human-derived *Mycobacterium leprae* to use palmitic acid in the synthesis of phenolic glycolipid-I and phthiocerol dimycocerosate and to release CO_2 in axenic culture. *Leprosy Review, 63(2),* p. 101-107, 1992.

Insufficient numbers of viable *Mycobacterium leprae* have hampered metabolic studies using human-derived *M. leprae.* In this study, sufficient numbers of *M. leprae* were obtained from an untreated lepromatous patient to titrate the effects of pH on the metabolism of ^{14}C-palmitic acid by *M. leprae.*

Catabolic metabolism (oxidation of ^{14}C-palmitic acid and release of $^{14}CO_2$) was maximal when *M. leprae* were incubated at 33°C and suspended in Middlebrook 7H9, ADC supplemented medium that had been buffered to maintain a pH of 4.8. Anabolic metabolism (synthesis of ^{14}C-phenolic glycolipid-I and its precursor, ^{14}C-phthiocerol dimycocerosate) was maximal when the pH was maintained at 6.8.

OUTROS EXAMES LABORATORIAIS

BABU, S.S.S. et. al. Adenoside deaminate activity in leprosy. *Ind. J. Lepr.*, 62(4), p. 473- 477, 1990.

Adenoside deaminase (ADA) activiity was studied in serum and peripheral blood lymphocytes of leprosy patients and healthy controls. Serum ADA levels were found to be elevated in tuberculoid as well lepromatous cases compared to control subjects. Serum ADA activity was significantly higher in tuberculoid cases than in the lepromatous group. lymphocyte adenosine deami nase activity showed a similar trend. These results suggest that, since the overall activity of the enzyme is not deficient in leprosy, the cellular immune abberation seen in the different types of leprosy may be due to abnormal proliferation of different subsets of lymphocytes in response to *M. leprae.*

CHANTEAU, S. et. al. Relationships between PGL-1 antigen in serum, tissue and viability of *Mycobacterium leprae* as determined by mouse footpad assay in multibacillary patients during short-term clinical trial. *Leprosy Review, 61(4),* p. 330-440, 1990.

In connection with a 56-day controlled clinical trial for comparing the therapeutic effects

between pefloxacin and ofloxacin in 21 lepromatous patients, we have studied the relationships between PGL-1 antigen level in serum and in skin and serum PGL-1 antibody titre on the one hand, and the viability of *Mycobacterium leprae,* as measured by serial mouse footpad inoculations, and other bactericidal parameters on the other. Before and during treatment significant correlation was found between serum PGL-1 level and the morphological index (MI), and with the number of viable organisms per mg skin tissue. However, neither serum PGL-1 antibody titre nor skin PGL-1 antigen level showed significant change during the 56-day trial. Because the reduction of serum PGL-1 level was well correlated but less pronounced as compared with the evolution of viable organisms during treatment, the serum PGL-1 antigen assay may be useful as an early indicator of response to chemotherapy in short-term clinical trial, but it is unlikely to replace mouse footpad inoculation for the evaluation of viability of *M. leprae.*

DHAWAN, V. et. al. Prostaglandin F_2 a in Leprosy - A Preliminarly Study. *Ind.J.Lepr., 62(1),* p. 45-49, 1990.

Prostaglandin $F_2\alpha$ was estimated in the sera of fifty patients in the leprosy spectrum to find out the status of prostaglandins in response to *Mycobacterium leprae.* Contrary to expectation, $PGF_2\alpha$ could be detected in only twenty-eight percent of leprosy patients. This preliminary findings is discussed in detail in the paper.

GARG, R. et. al. Glucose Tolerance Test in Leprosy. Ind.J.Lepr., 62(1), 1990.

Glucose tolerance test was carried out in 43 cases of leprosy. They included cases of tuberculoid, borderline, lepromatous leprosy and those with lepra reaction. Flat glucose tolerance curve was observed in borderline and lepromatous leprosy. However, the diabetic curve was common in Lepra reaction.

Fasting blood was low in lepromatous leprosy and it tended to be marginally high in lepra reaction. Normal GTT response was observed in those with duration of disease between 0-6 months, flat curves in those with duration of disease between 7-12 months while diabetic curve was more common in those with disease duration of more than 2 years.

GARG, R. et. al. Thyroid function in leprosy. *Ind. J. Lepr., 62(2),* p. 215-218. 1990.

Thryroid function tests were carried out in 43 cases of leprosy. The study subjects included of tuberculoid, borderline and lepromatous leprosy and those with lepra reaction. The parameters studied included serum cholesterol, protein bound Iodine, serum T_3 level and serum T_4, levels. The levels of serum cholesterol and protein bound Iodine were normal in all the four groups of leprosy patients. However, the mean serum T_3 and T_4 were low in all the four groups. The difference in the levels of serum T_3 was statistically significant only in the lepra reaction group. The levels of T_4 were statistically significantly decreased in borderline leprosy, lepromatous leprosy and in lepra reaction.

JADHAV, V.H. et. al. Fibrinolytic phenomenon in leprosy. *Ind. J. Lepr., 62(2),* p. 208-214, 1990.

Fibrinolytic activity in patients eighty-one with different types of leprosy and thirty-two normal healthy controls was studied by Euglobulin Lysis Time Method. Fibrinolytic activity was markedly decreased in patients with lepromatous leprosy and those with ENL reaction. Decline in fibrinolytic activity during ENL was independent of frequency of attacks. Fibrinolytic activity was partly restored after subsidence of ENL reaction, though it failed to attain normal levels. Cutaneous vasculitis seems to be most probable cause of fall in fibrin-olytic activity in lepromatous leprosy and ENL reaction.

RAV, S.D. et. al. Mast cell in leprosy. *Ind. J. Lepr., 62(4),* p. 467-472, 1990.

Mast cell distribution in the affected skin and in the apparently normal skin at least 10 cm away from the lesion was studied in 250 leprosy patients. These cells were found and were more numerous in the apparently normal skin of established cases of leprosy as well amongst indeterminate group. Absence of mast cells was conspicuous in 16.7% BB, 40.9% BT, and 68.0% TT lesions. It is suggested that mast cells might play a role in the early stages of the disease and in postreactional connective tissue proliferation.

SAXENA, N. et. al. Serum iron and total iron binding capacity in leprosy patients. *Ind.J.Lepr., 62(2),* p. 219-222, 1990.

Serum Iron and total Iron binding capacity was estimated by Ramsay's Method in 40 leprosy patients having different types of leprosy and 20 normal subjects serving as controls. Significantly low serum Iron and total Iron binding capacity were observed in lepromatous leprosy patients.

SEN, R. et. al. Bone marrow cyto-morphological changes in multibacillary leprosy. *Ind.J.Lepr., 62(3),* p. 321-327, 1990.

Seventy-two cases of multibacillary leprosy were investigated for cytomorphological changes and presence of lepra bacilli in bone marrow. These patients were divided in two groups. Group A (28) comprised of new cases and group B (44) of those receiving treatment. Myeloid hyperplasia was mostly seen in patients of group B who had erythema nodosum leprosum. Mega-Ioblastic change in erythoblasts was seen frequently in both the groups. While average number of plasma cells and macrophages was on the higher side normal range, detection of large number of plasma cells underline enhanced humoral response and created diagnostic problem with multiple myeloma. Morphological changes in the macrophages, their collections and epithelioid cell granulomas were observed in bone marrow. Their nature and significance is discussed.

TANEJA, K. et. al. Hepatic ultrassonography in patients with lepromatous leprosy. *Ind.J.Lepr.62(4),* p. 443-447, 1990.

Hepatic Sonography was done in 36 patients with lepromatous Leprosy and 3 patients with borderline lepromatous leprosy with view to assess abnormalities of size, changes in the echotexture and to observe the presence of any nodules and calcification in the liver. Routine liver function tests were also done in these patients. No definite abnormal sonography findings were seen in the liver in a large majority of these patients. One patient, however, showed nodular changes in the liver.

VIJAYALAKSHMI, K. et. al. Effect of Presensitization with BCG and *Mycobacterium leprae* on Granuloma Formation to M. *leprae. Int.J.Lepr., 58(4),* p. 674-680,1990.

Granulomas which develop in draining lymph nodes, following the intradermal injection of cobalt-irradiated *Mycobacterium leprae* into the ear of the guinea pig 2 and 5 weeks earlier, were studied in animals which had been presensitized with BCG vaccine or M. leprae and compared with granulomas that developed in previously unsensitized guinea pigs. Presensitization with mycobacteria accelerated the development of the granulomas. Granulomas in previously unsensitized guinea pigs were found ultrastructurally to contain phagocytosing macrophages similar to those in lepromatous leprosy, and *M. leprae* presensitization did not alter the type of granuloma found. Those in BCG-presensitized guinea pigs contained secretory epithelioid cells with rough endoplasmic reticulum similar to those found in borderline tuberculoid leprosy or reversal reactions. The significance of these findings in relation to the current use of vaccines in leprosy is discussed.

FOSTER, R. et. al. Profile of blood elements in leprosy patients. *Ind.J.Lepr., 63(1),* p. 12-33, 1991.

Blood levels of 40 elements in 14 leprosy patients and 5 control subjects living near Mukinge Hospital in the North Western Province of Zambia were detemined by spectrophotom etry. In patients, compared to controls, serum levels of titanium, silicon, potassium and platinum were significantly higher; red cell levels of phosphorus were lower but those of antimony, bismuth, nickel, titanium, yttrium, silicon and platinum were higher, and whole blood levels of phosphorus, selenium, antimony and silver were lower. There were also significant differences in levels of certain elements when histologically active and inactive patients were compared and between the polar forms of leprosy. The data are consistent with a hyphotesis of metabolic and nutritional involvement in the etiology of leprosy.

GEORGE, J. et. al. Serum Zinc/Copper Ratio in Subtypes of Leprosy and Effect of Oral Zinc Therapy on Reactional States. *Int.J.Lepr., 59(1),* p. 20-24, 1991.

Serum zinc and copper levels and zinc/ copper ratios were studied in 86 healthy controls, 45 cases of borderline tuberculoid (BT), 31 cases of borderline lepromatous (BL), 117 cases of lepromatous (LL) leprosy patients, 16 cases with severe erythema nodosum leprosum (ENL) reaction, and 16 cases with ENL reaction receiving oral zinc therapy. A significant reduction in serum zinc levels was noticed in all typed of leprosy, the maximum decrease being seen in cases with ENL reaction. Conversely, the copper levels were significantly increased from BT to LL cases with ENL reaction in a progressive manner. A very good negative correlation (r = -0.998) was noticed between mean serum zinc and copper levels from healthy controls to active LL cases with ENL reaction. After oral zinc therapy, the serum zinc levels were significantly increased in all of the 16 LL patients with ENL reaction. In contrast, the copper levels were not decreased, indicating that oral zinc therapy can restore normal zinc levels in leprosy patients but is unable to reduce the increased copper levels.

HAAS, M. et. al. Determination of in vivo and in Vitro Drug Effects of Mycobacteria from the Mass Spectrometric Analysis of Single Organisms. Int.J.Lepr., 59(2), p.262-270,1991.

Laser microprobe mass analysis of single bacterial organisms allows the determination of their intrabacterial ratio of sodium-to-potassium ions and the registration of fragment ions originating from their organic bacterial cell matrices as mass fingerprint spectra. It has been established previously that the intrabacterial cation ratio provides Information on the physiological state of an individual bacterial cell. In the present experiments it is also shown, with different cultivable mycobacterial species and strains (drug sensitive and resistant) exposed to various drugs, that data derived from the evaluation of the mass fingerprint spectra reflect changes in the degree of impairment. The analysis of Mycobacterium leprae derived from a limited number of skin biopsies of lepromatous/borderline lepromatous leprosy patients under World Health Organization-recommended multiple-drug therapy (WHO/MDT) showed impairment of the organisms with both of the methods of measurement in proportion to the duration of treatment except in one case. In one M. leprae population from a patient who had been treated for 19 months, the fingerprint evaluation gave the first evidence for an insufficient response to treatment. This was further confirmed by the unusual frequency distribution of the Na^+,K^+ ratios wich revealed the existence of two subpopulations, one impaired and one unimpaired.

JAIN, V.K. et. al. Gamma-glutamyl transpeptidase in leprosy. Ind.J.Lepr., 63(1), p. 93-96,1991.

Activity of the enzymegamma-glutamyl transpeptidase (GGTP) was measured in sera of 20 patients each of paucibacillary and multibacillary leprosy and 20 healthy controls. None of the subjects had any systemic or hepatic disease and none had taken any hepatotoxic or antileprotic drugs in the past 3 months. Mean values in the paucibacillary group (38.62±1.99 U/L) and in the

multibacillary group (59.04±3.13 U/L) were significantly higher compared to that in controls (32.04±0.66 U/L). Mean value in the multibacillary group was also significantly higher compared to that in the paucibacillary group.

JOB, C.K. et. al. Comparison of polymerase chain reaction technique with other methods for detection of *Mycobacterium leprae* in tissues of wild nine-banded armadillos. *Lepr.Rev., 62(4),* p. 362-373, 1991.

Thirty, nine-banded armadillos weighing between 3 and 5 kilograms trapped from an area endemic for armadillo leprosy were collected at random; killed, autopsied and examined histopathologically. Also, one of the right inguinal lymph nodes was removed under sterile precautions and examined using PCR, direct smear examination, mouse footpad study, culture in laboratory media and histopathology with a view to detecting *Mycobacterium leprae.* Blood was collected at death and tested for IgM antibodies to PGL-1.

According to the PCR study of the inguinal lymph nodes 16 of 30 armadillos (53.3%) had evidence of *M. leprae.* Significant levels of IgM antibodies to PGL-1 and identifiable lepromatous granuloma in inguinal lymph nodes were found in 2 animals (6.7%) with advanced disseminated disease. The prevalence of generalized leprosy according to autopsy study was 13.3% and according to histopathological examination of ear tissue 3.3%. The presence of *M. leprae* in the tissues evoked no special tissue reaction in the early stages. The pattern of spread of the disease in 2 animals ciosely resembled that found in experimental animals infected intracutaneously. Initiation of infection by Inoculation of *M. leprae* throug thorn pricks remains a distinct possibility.

MAHADEVAN, P.R. et. al. Delipidified cell components of *Mycobacterium leprae* and its applications. *Ind.J.Lepr., 63(3,4),* p. 371-387, 1991.

Delipidified cell components (DCC) of *Mycobacterium leprae* obtained as an Insoluble material consist of several proteins. This preparation, DCC, has ability to differentially bind to sera from lepromatous leprosy patients and antibodies to this complex get reduced as patients improve under chemotherapy. The antigenic complex has no ability to bind to proteins of sera from normal healthy individuals or tuberculoid leprosy patients. The DCC is antigenic and is recognised by immune deficient cells of lepromatous leprosy patients, leading to lymphocyte proliferation, production of Interleukin II and interferon y, and resulting in activation of the phagocytes to initate killing of endocytosed *M. leprae* through reactive oxygen intermediates, primarily superoxide. The DCC has also immunomodulatory properties to protect mice against *M. leprae* infection. Experiments with mice and isolated peripheral blood cells from patients have indicated the probable molecular mechanism of immunomodulation by DCC.

SEN, R. et. al. Lipid-laden macrophages in bone marrow of leprosy patients. *Lepr. Rev.,* p. 374-380, 1991.

While conducting a study to observe bone marrow cytomorphological changes in multibacillary leprosy, lipid laden macrophages as seen in sphingolipidoses were noted. The present study was planned to observe the occurrence and morphological characterization of these macrophages in various types of leprosy. Bone marrow records from 48 cases of paucibacillary and 72 cases of multiacilary leprosywere analysed. The macrophages accounting at the most for 3.5% of marrow cells were observed in 5 cases of paucibacillary and 43 cases of multibacillary leprosy with a maximum incidence being observed in patients with ENL (16/17). The lipid present in the cytoplasm of these cells could be derived from the lipid of the cell wall of *Mycobacterium leprae.* To the best of our knowledge, these cells have not been reported in leprosy so far.

WRIGHT, S. et. al. Essential Fatty Acids in Plasma of Patients with Leprosy. *Int.J.Lepr., 59(2),* p. 271-277, 1991.

We have investigated the fatty-acid composition of plasma phospholipids in 61 patients with leprosy of various clinical types with either a short or long duration of treatment. All patients had significantly decreased levels of linoleic acid and alphalinoleic acid, the parent fatty acids of the n-6 and n-3 families, respectively. Patients with a treatment duration of more than 6 months had significantly low levels of arachidonic acid and eicosapentaenoic acid compared to controls or to patients with a treatment duration of less than 6 months. There were no differences in the fatty-acid composition between multibacillary patients and paucibacillary patients. We conclude that dietary supplementation with essential fatty acids may be indicated in patients with leprosy, particularly in those with a long treatment duration.

YODER, L.J. et. al. Comparison of a urine spot test and blood tests as indicators of patient compliance. *Ind.J. Lepr., 63(2),* p. 195-202, 1991.

Irregular drug intake has been a concern of leprosy control programmes for many years and various methods have been used to monitor and encourage patient compliance. This study compare the results of a urine spot test for dapsone as proposed by Huikeshoven, with blood levels measured in the same patients by the modified Bratton Marshall method and by high performance liquid chromatography. Two hundred-sixty urine and blood specimens were obtained from subjects who were taking supervised and unsupervised medications as well as from controls who were taking no medications.

The results indicate that the urine spot is simple and easily performed, and for monitoring patient compliance under routine clinical conditions (hospital or field work) it compare favourably with blood levels of dapsone estimated by the Bretton Marshall method or by high performance liquid chromatography. The study also shows that dapsone level is not a good indicator of compliance in patients who are also taking daily rifampicin but the urine spot test remains useful in such patients.

AHALEY, S.K. et. al. Correlation of serum lipids and lipoproteins in leprosy. *Ind.J.Lepr., 64(1),* p. 91-98, 1992.

Serum lipids and lipoproteins were assessed in sixty and forty age and sex matched healthy controls. The study subjects included cases of LL with reactions, LL without reactions, BL with reactions, BL without reactions, BT and TT types of leprosy.

The levels of serum phospholipids, trig - lycerides, total cholesterol, LDL and VLDL fractions were significantly decreased in leprosy patients compared to control subjects. The levels of serum HDL cholesterol and HDL fraction were significantly elevated in leprosy patients.

Maximum elevation in serum HDL cholesterol level and HDL fraction and maximum reduction in the levels of serum phospholipids, triglycerids, total cholesterol and LDL and VLDL fractions were observed in lepromatous leprosy (LL) patients with reactions.

HARSHAN, K.V. et. al. Uptake of Purine and Pyrimidine Nucleosides by Macrophage-resident *Mycobacterium leprae:* H-Adenos ine as an Indicator of Viability and Antimicrobial Activity. *Int.J.Lepr., 58(3),* p. 526-533, 1990.

Freshly extracted human- and armadillo - derived *Mycobacterium leprae* maintained within murine macrophages incorporated significant levels ($p < 0.05$ top < 0.001) of ^{3}H-adenoside and ^{3}H-hypoxanthine by 6 and 9 days of the culture period. The incorporation of ^{3}H-adenoside was twofold or more higher than ^{3}H-thymidine in 10 out of 15 human-derived *M. leprae* isolates. Macrophage-adapted bacilli incorporated 10-14-fold higher levels of ^{3}H-adenosine compared to the same bacilli maintained in axenic cultures. The incorporation of these two labels was Inhibited bydapsone and

rifampin, indicating the utility of in vitro radiometric assays for screening antileprosy drugs and drug sensitivity/resistance in patients.

PROGRAMAS E TRABALHOS DE CAMPO E ASPECTOS SOCIAIS EPIDEMIOLOGIA

KRISHNAMURTHY, K.V. & RAO, S.P. A study of leprosy affected beggars in Aska. *Ind. J.Lepr.*, 62(1), p. 113-119, 1990.

A study conducted among beggars in and around Aska, Orissa revealed 41 of them to be leprosy patients. Almost all had taken treatment and had been released from control. Only 2 of them were mildly positive in their skin smears for AFB. All of them had disabilities and deformities. It is evident that at least in this area beggar leprosy patients cannot be contributing to the transmission of the disease. Theirtreatment regularity record was also very good.

MOITA, C.P. & ZUNIGA, G.M. Time Trends of Hansen's Disease in Brazil. *Int.J.Lepr., 58(3),* p. 453-461, 1990.

In an analysis of the trend of Hansen's disease in Brazil, the "incidence register" or "detection rate" per 100,000 was used. The operational data analyzed were presumed to be related to true incidence because of the time elapsed (38 and 19 years) and because of the large number of cases. The statistical method used was the exponential curve fit. From 1950 ro 1968, there was an average annual decrease in the rate of 3% as indicated bythe regression coefficient (slope), but from 1969 to 1987 an increase of 6% per year was observed. If this last trend is sustained, the detection rate in the year 2000 will be 35.03 per 100,000 or, in a population estimated as 190,000,000 in habitants, 66,600 new cases. For comparison, in 1983 there were 18,759 new case registered. The trend analysis for each of Brazilian political-administrative are (states and territories) is more accentualy in the Center-West and Northeast Macroregions, with a slope of 8% and 10%, spectively. In some states, such as Paraiba, Rio Grande do Norte, and Alagoas, the were astonishingly positive slopes of 20, 18% and 17%, respectively. The distribution of the new cases by clinical forms during most of the period studied (1969-1987) confirms the overall trends observed. There was an increase in the detection rate of the tuberculoid form of 5% annually - compared to the lepromatous (combined with borderline) rate of 3% per year - and, also the increase in the tuberculoid form awas greatest in the Center-West and Northea Macroregions. In conclusion, there is strong probability of an increase in the transmission of Hansen's disease in Brail a situation of great concern for public healthy authorities.

NAIK, S.S. et. al. Leprosy Survey in Night High Schools in Greater Bombay. *Int.J.Lepr., 62(1),* p. 116-119, 1990.

A survey of 6096 students attending night high schools in Bombay the prevalence rate of leprosy 9.3 per 1000 this group. 10.5% of the cases identified were having more serious forms of leprosy characterised by nerve involvement or skin smear positivity. Night school screening has limited value as it can only be conducted in big industrial cities and such surveys cover only a very small proportion of the population. However, in view of the current tendency of population shift from rural to urban areas and since such survey can identify a number of established cases it can be included among the other routine leprosy case detection activities in big cities, where night schools exists.

RAO, P.S. & SIRUMBAN, P. Screening of registered leprosy cases and its effects on prevalence rate. *Ind.J.Lepr., 62(2),* p. 180-192, 1990.

Prevalence rates of leprosy in 6 endemic

districts in Andhra Pradesh, India with a population of 168.71 lakhs (1981 census) were studied before and after screening of registered cases. The screening was carried out as part of multidrug treatment project implementation. After such a sharp fall in the registered prevalence rate, by 26.2% on the average, was observed in all the districts. About 34.8% of the total cases were declared as Released from control. The implication of these findings regarding registered cases fit for such release and the overall registered prevalence rates in the country must be kept in mind.

WELE, D.S. Health education for the successful implementation of MDT. Ind.J.Lepr., 62(3), p. 346-359, 1990.

The importance and goals of health education in leprosy are pointed out. The responsibilities of the health education are outlined. The role of health education in the context of the MDT programme is discussed.

CAMPOS-OUTCALT, D. An evaluation of a microcomputer information system for leprosy control two years post -implementation. *Leprosy Review*, 62(1), p.65-71,1991.

As part of a national programme to improve the management of health services in Papua New Guinea, a microcomputerized information system was designed and implemented in seven provinces. Four other provinces later adopted this system. One component of this information system was a program to assist disease control officers to monitor the treatment received by leprosy and tuberculosis patients.

In contrast to other components of the information system, the leprosy and TB computer program was not maintained nor used after two years. This article describes the computer program developed and discusses possible reasons for its nonuse.

CROOK, N. et. Al. An educational approach to leprosy control: an evaluation of knowledge, attitudes and practice in two poor localities in Bombay, India. *Lepr. Rev.*, 62(4), p. 395401, 1991.

Based on the hypothesis that a systematic, carefully planned educational approach to leprosy would yield results in terms of knowledge, attitudes and case presentation superior to those of the established and traditional mass survey method, ALERT-India launched a programme in S ward of Bombay in February 1985, to compare the two. An intensive programme of healthy education, using trained teams, was carried out in one zone of this ward over a period of 12 months. Eight months later, mass survey work (as used routinely in previous years and on a country-wide basis) was carried out in an adjacent zone. In 1987, the Centre for Social and Technological Change in Bombay, in association with the School of Oriental and African Studies, University of London, was requested to evaluate the effect of the above educational approach in terms of knowledge, attitudes and practice in both the trial and control zones. Other aspects of this experimental approach, including its cost and effectiveness in identifying cases of leprosy, will be published separately. The design of the 'KAP' evaluation and the social and environmental controls introduces in the statistical analysis are described. The results pointed to a considerable degree of ignorance about leprosy as a disease (and its treatment) in both the study and the control zones. Knowledge about early symptoms was particularly weak and on all aspects scores for women were invariably lower than men. General education enhanced the absorption of specific knowledge, and the education of children compensated adequately for lack of parental education in this respect. Overall the evaluation indicated that the intensive educational approach was superior to the survey approach in terms of improving knowledge, attitudes and practice.

KRISHNAMURTHY, P. et. al. Seroepidemiological Study of Leprosy in a Highly Endemic Population of South India Based on an ELISA Using Synthetic PGL-I. *Int.J.Lepr.,* 59(3), p. 426-431, 1991.

As part of a continuing longitudinal immunoepidemiological study, blood samples were collected by finger prick from 4243 individuals living in a highly endemic area for leprosy in South India. The samples were tested for IgM antibodies against phenolic glycolipid-I using an ELISA. Seropositivity defined as optical density z 0.2000 was marginally higher in the age group 1030 years and in females. There was no evidence for a higher level in contacts than In noncontacts. The future prospect for the large scale use of this ELISA in high-endemic populations in special epidemiological investigations or routine control programs as a serological tools to detect leprosy infection appears questionable.

KUMAR, A. et. al. The factors influencing the operational efficiency of leprosy case detection programme. *Ind.J.Lepr., 63(2),* p. 180-194, 1991.

Under our National Leprosy Eradication Programme, Leprosy cases are being detected by para-medical workers by conducting population surveys. In order to detect the leprosy cases early, for their timely anti-leprosy treatment, it is necessary that the leprosy surveys are implemented and supervised efficiently. However, present experience indicates that the existing survey efficiency needs to be improved, for which it is necessary to analyse the factors which may interfere with the optimal survey efficiency of para-medical workers. An attempt has been made through present piece of work to identify such factors in relation to (i) the para-medical workers and survey facilities, (ii) the implementation and supervision of leprosy survey and (iii) the community involved in survey. These factors are discussed in detail to assist the NLEP Administrators in devising a suitable action plan to improve leprosy case detection efficency.

KUMAR, R.P. *et. al.* Transmission of health information on leprosy from children to their families: another approach to health education. *Leprosy Review, 62(1),* p. 58-64, 1991.

A controlled study was carried out in the North Arcot District of Tamil Nadu, South India to determine whether health Information given to schoolchildren would Influence the knowledge and attitudes of their families concerning leprosy. A total of 41 children and almost all of their household members participated in the study.

The study, conducted by questionnaire, involved a pre-test of knowledge and attitude about leprosy of seventh standard and their families. After one group of children received health education about leprosy and the other received information about tuberculosis, an identical post-test questionnaire was administered to all participants.

Although significant improvement in knowledge about leprosy was detected in the leprosy educated group of children compared with controls, no trasnmission of information on leprosy was detected in the family members of either group. The attitudes of the children who had been educated about leprosy may have been adversely affected by the health education session.

The reasons for our failure to detect significant transfer of information about leprosy In this setting are discussed, as well as the need for additional reasearch in this area.

MURTHY, P.K. et. al. A computerized Information system for evaluation of NLEP through monthly progress reports. *Ind.J.Lepr., 63(1),* p. 70-77, 1991.

A computadorized system for monitor - ing district-wise operational performance and epidemiological progress using existing regular and special monthly reports of the National Leprosy Eradication Programme (NLEP) is presented. The same system, with wich some minor modifications sould be used for programme assessment at the Leprosy Control Unit level also. The

advantage of the system is the speed with it can generate output in the form of comparative tables and graphs for different regions for use by programme managers for making overall assessments in time and for sending feedback reports to workers at various levels, for self-assessment and for taking timely corrective action. The system presented provides immediate and easy access to the stored and/or processed information (indicators etc.) at any time. The system has been pilot-tested using monthly reports from eighteen districts of Tamil Nadu.

NAIK, S.S. et. al. Problems and needs of women leprosy patients in Bombay and Goa - preliminary report. *Ind.J.Lepr., 63(2),* p. 213-217, 1991.

By studying the status of 151 women leprosy patients (24 from a leprosy asylum and 127 attending urban leprosy centres at Goa and Bombay), it was noticed that a sizeable proportion experienced problems in society ascribable to the disease especially at the initial stages of the disease. However, most of them seemed to have managed to settle well in their families as housewives subsequently. Younger women leprosy patients expressed the need for financial assistance for completing their own education and for starting small scale business. The older women were more interested in educating their children.

RAVEENDRANATHAN, O. et. al. Epidemiological significance of indeterminate leprosy - A hospital based study. *Ind.J.Lepr, 63(1),* p. 5-11, 1991.

An epidemiological analysis of 100 cases of indeterminate leprosy attending the Department of Dermatology and Venereology of Medical College Hospital, Trivandrum, is presented. It was found that indeterminate leprosy formed 13.23% of all cases of leprosy and 1.3% of all outpatients attending this department. Only 27% of patients with indeterminate leprosy were below 15 years of age. There was a predominance of males especially over 20 years of age. There was no history of contact with leprosy in any of the patients with indeterminate leprosy. All patients with indeterminate leprosy came for hypopigmented patches, suspecting leprosy. Majority had the disease for more than 6 months. single lesion on the outer aspect of extremity was the most common presentation. The lepromin test was positive in only 2% of patients with indeterminate leprosy, while it was positive in 80% of control subjects. Three cases of dapsone resistance were suspected in this series. The epidemiological significance of the findings is discussed.

REE, G.H. Pattern of leprosy in Queensland, Australia, 1855-1990. *Lepr.Rev., 62(4),* p. 420-430, 1991.

Leprosy was first diagnosed in Queensland in 1855. From then until 1990, 929 patients with the disease were notified. The pattern of notification has varied with the passage of time, and with the changing pattern of migration into Queensland. In the early days, Chinese, Melanesians and Caucasians featured prominently. The first Aboriginal notification was in 1892. In the latter part of this century, significant numbers of Torres Strait Islanders and migrants from South East Asia have been recorded. Among Caucasians, the incidence peaked in the decade 1931-1940, although the prevalence rate in this population remains much higher than in Caucasians. The control of leprosy is at a high level in Queensland today, but there is a continuing low level of new case reporting, many of them imported.

SAMY, A.A. et. al. ALERT-India 1981-89: nine years'experience of leprosy controle in the slums of Bombay. *Leprosy Review, 62(3),* p. 315-328, 1991.

Bombay has a population of about 8 million people, one-half of whom live in slums. In 1981, ALERT-India started its first leprosy control project in N, S and T Wards of Greater Bombay Municipal Corporation covering an area of 122 sq km in the north-eastern suburbs of Vidhayavihar, Ghatkopar, Vikhroli, Kanjurmarg, Bhandup and

Mulund, with a total population of 1,100,000 according to the 1981 census. In the 9 years of operation, over 12,000 patients have been registered and treated and of these 7425 have been released from treatment, having satisfactorily com pleted courses of chemotherapy. However, over 1000 cases are still identified every year by house-to-house or school surveys, or by self-reporting, including a considerable percentage in children. The origin, development, staff structure, operational procedure, administration and recording system of ALERT-India are described in detail, with emphasis on what has been accomplished with purely outpatient facilities, using paramedical workers, all of whom have received inservice training from Govemament recognized training centres for their specific tasks. The account includes a brief description of an expansion of the organization's work into townships in New Bombay, where preliminarly surveys in 1988 confirmed the presence of leprosy cases and the need for treatment facilitied. The discussion addresses: 1, the better use of the large volume of statistical information which has been collected by ALERT-India during the past 9 years, with emphasis on its value in assessing the impact on the control programme and modifying future policy; 2, the need to radically examine the present policy of survey, versus an education campaign approach'with regard to increasing early case-detection and self-reporting; 3, the establishment of a central coordinating body for leprosy control in Bombay to exchange information, coordinate efforts and formulate a future plan of action, the latter in association with the National Leprosy Eradication Programme; and 4, the development of a healthy education resource centre in association with the Bombay Municipal Corporation.

AWOFESO, N. Appraisal of the Knowledge and attitude of Nigerian nurses towards leprosy. Leprosy Review, 63(2), p. 169-172, 1992.

The attitudes of nurses toward leprosy are studied and in this paper. The findings show that their knowledge of leprosy is lacking and that they also fear leprosy. This study recommends that leprosy should be included in the basic nursing curriculum in order to increase awareness and to the decrease stigma of leprosy.

BHORE, P.D. et. al. Child-to-parent education: A pilot study. *Ind.J.Lepr., 64(1),* p. 51-57, 1992.

A controlled study carried out in hilly Konkan region on the West coast of India showed that school children have the potential for transmitting their newly acquired knowledge to their parents. Though the results indicate that acquisition of knowledge does not mean a change in attitudes conceming leprosy, child-to-parent education may show promising results in leprosy education in developing countries where most parents of school children are illiterate and are not easily reached by conventional methods of health education.

CARTEL, J.L. et. al. Leprosy in French Polynesia. Epidemiological trends between 1946 and 1987. *Leprosy Review,* 63(3), p. 211-222, 1992.

Summary The analysis of computerized data (OMSLEP system) on patients from French Polynesia followed since 1940 has shown a decrease in the mean annual detection rates for leprosy, all forms combined, from 24.73 per 100,000 inhabitants in 1946 to 8.1 per 100,000 in 1987 ($y = -0,49x+45.83$; $p<0.05$). In fact, the decrease was significant ($y= -1.18x+83.54$; $p<0.05$) during the first half of the study period (1946-66), but not during the second half (1967-87). Similarly, a significan decrease in all of the specific mean annual detection rates (according to the form of leprosy and to the sex and age patients), in the proportion of multibacillary patients among the total of newly detected cases, and in the proportion of all patients with disabilities at the onset of leprosy was observed only during the first half of the study period (1946-66). Nevertheless, when comparing age-specific cumulative detection rates, calculated by 10-year age groups over the period 1946-66, to those of the period 1967-87, an ageing of the leprosy population was

noted. Finally, the decrease of mean annual detection rates was greater in the smaller populations of remote islands than in the population of Tahiti, the mains island, where 70% of the total population were living durign the study period. This decline was shown to correspond to an effective improvement of the leprosy situation which could be attributed, among other factors (such as economic development and systematic BCG vaccination), to the implementation of a control programme for leprosy in 1950. The introduction in 1982 of multidrug therapy for all patients suffering active leprosy has raised the hope of a subsequent decline of leprosy in French Polynesia in the near future.

DAY, R.; LEVER, P. & ASRI, M. Leprosy control in 7 districts of South Sulawesi, Indonesia, 1986-91. *Leprosy Review, 63(3),* p. 247-254, 1992.

This paper describes the leprosy control programme in 7 districts of the South Sulawsi Province in Indonesia. This province is reported to have the highest prevalence of leprosy in the country. The programme started in 1986 with re-registration of all patients on the cumulative registers. Strict criteria for admission of patients to MDT were initially applied. In 1990 it appeared that these criteria had been too strict, thus necessitating a second re-registration of patients still on DDS monotherapy. More flexible criteria for admission to MDT led to an increase in MDT coverage from 45% to 78% within 6 months.

By April 1991, 5 years after the start of the programme, the registered prevalence had decreased from 4.4 per 1000 in 1986 to 1.6 per 100; the coverage with MDT had increased from 6% in 1986 to 78%, and the case detection rate remained stable around 4 per 10,000 after an initial increase at the start of the programme.

KANNAN, N. & SILVARAM, M. Variables influencing regularity of leprosy patients in attending treatment clinics. *Ind.J.Lepr., 64(4),* p. 505-512, 1992.

Regularity in attending clinics as well as drugs assume a very significant place in leprosy control programme since irregularity of leprosy patients can lead to poor disease control, drug resistant disease, and development of physical deformities and disabilities thus leading to programme failure. Further, these complications also create socio-economic and psychological problems to the victims as well as their families in myriad ways. This paper reports a study aimedat identifying the variables, among a of dired at 29 selected demographic, socio-economic and disease-related variables, having significant association with regularity of leprosy patients in attending treatment clinics It was found that age of the patients, type of family, duration of the disease, time lag between diagnosis of the disease and starting treatment and knowledge of patients and their families about the disease were significantly associated with treatment regularity.

LENNON, J.L. & COOMBS, D.W. An application of the LePSA methodology for health education in leprosy. *Leprosy Review, 63(2),* p. 145-149, 1992.

This paper describes how the innovative LePSAtechnique can be used bycommunity health workers to appropriately educate and increase compliance among leprosy patients. A lesson plan illustrating the interactive nature of the technique in a hypothetical Third World community is presented. The lesson plan, using MDT default, shows how the technique can elicit individual participation in a group setting and serve as both an educational and a behaviour change tools.

MURTHY, P.K. et. al. Time lag between case registration and commencement of treatment in a leprosy control unit. *Ind.J.Lepr., 64(1),* p. 8-13, 1992

Analysis of client-based data as a part of computerised management information system in a Government leprosy control unit in Tamil Nadu reveals that there was delay in initiating treatment of leprosy patients. The mean and standard devia-

tion of the period of delay for cases registered before, within 6 months and after 6 months of start of MDT in the Unit were 6.80±6.40, 1.97± 3.60 and 0.90±2.21 months respectively. Further, the delay was longer in PB, female and child cases. Giving priority to therapy for backing cases and an effective monitoring system with specific indicator for time lag in starting treatment is indicated.

MYINT, T. et. al. A comparative KAP study of leprosy patients and members of the community in Hlaing and Laung-lon townships. *Ind.J.Lepr., 64(3),* p. 313-324, 1992.

A KAP study was conducted in the peri-urban Hlaing and rural Laung-Lon Townships in Myanmar. It was found that both the leprosy patients as well as community members were still not sure about the cause of leprosy. Social stigma of leprosy encountered by patients needs to be addressed especially in peri-urban areas. It was also found that the patient's understanding of treatment regularity was still very unsatisfactory for which health education measures needs to be introduced.

MYINT, T. et. al. Risk factors among defaulters in the urban leprosy control centre of Thaketa Township in the City of Yangon, Myanmar, 1986. *Lepr. Rev., 63(4),* p. 345-349, 1992.

A total of 884 registered cases from the city of Yangon were retrospectively analysed. The defaulter proportion among cases registered for treatment at the Thaketa Health Centre was 34.16%. It was established that patient sex and occupation are not a factor in defaulting. Paucibacillary cases and cases with no disability are more likely to default.

NOORDEN, S.K. et. al. Estimated number of leprosy cases in the world. *Ind.J.Lepr., 64(4),* p. 521-528, 1992.

Planning for disease control requires estimates of number of leprosy patients from local to global levels. From the mid-sixties to the mid-eighties, global estimates appeared to be constant at between 10 and 12 million. The introduction of multidrug therapy (MDT) in many countries and the consequent reduction of prevalence of the disease has necesitated a reassessment of the global estimate. Based on avaiable information and its interpretation, the number of leprosy cases in the world in 1991 has been estimated at 5.5 million. The number of individuals with deformities due to leprosy, including persons now cured of the disease, has been estimated at between two and three million.

PATTYN, S.R. et. al. Polymerase Chain Reaction Amplifying DNA Coding for Species-specific rRNA for *Mycobacterium Ieprae. Int. J.Lepr., 60(2),* p. 234-243, 1992.

The sensivity of the polymerase chain reaction (PCR) on the DNA coding for the species-specific fragment of 16S rRNA of *Mycobacterium leprae* studied on mouse foot pad harvests and human skin biopsies varies widely between 1 and 3 x 10^4 organisms. This is probably the result of variations in the proportions of organisms with sufficiently Intact DNA suitable for PCR. Preserving human skin biopsies for 3 weeks at an ambient temperature even after boiling for 6 minutes gives rise to a 10-fold decrease in sensitivity. Fixation of tissues in formol 10% or Lowy fixative or preserving in Dubos OAA broth is very harmful to the PCR, mainly due to the enhancement of an inhibitory effect on the PCR reaction. For preservation, the best choice at the moment seems to be alcohol 70%. Sample preparation of five cycles of freeze-boiling is simple and generally more efficient than proteinase K treatment and DNA extraction.

PREMKUMAR, R. & DAVE, S. Relationship problems between doctors and paramedical professionals working in leprosy with reference to a possible solution. *Leprosy Review, 63(2),* p. 173-182, 1992.

An empirical investigation was conducted

on the in-group dynamics of health personnel working in leprosy. The sample populations were taken from the National Leprosy Eradication Programme (NLEP) enployees of two state governaments in India. They consisted of 21 doctors and 335 paramedicals, the former constituing a formal group and the latter a semi-formal group. Two separate scales were developed for each of these groups to elicit information on five potential areas of intergroup relationships.

The results indicated that there was very poor acceptance of the out-group and its roles, i.e. poor acceptance of the paramedicals by the doctors and vice versa. Three reasons were elicited from this study. First, doctors held their professional standing to be on a higher level than the paramedicals, leading to excessive social distancing between doctors and paramedicals. Second, multiprofessional involvement in NLEP work has increased the trend of professional overlapping, leading to a significant apprehension of the encroachment of skills. Third, there was a mutual lack of trust of each others professional skills. Despite these problems the overwise more severe human relationship problems, such as domineering behaviour and prejudiced perception agaisnt the out-group were found to be significantly less in this study.

In order to improve working relationships between these groups a method that has been used at Karigiri is recommended. The method has two parts. This first is aimed at intrapersonal understanding and the second at the development of interpersonal skills. Role play that mimics their original work situation and an analysis of case histories were the methods of teaching were found to be more advantages in internalizing these skills.

SAHA, S.P. & DAS, K.K. Study of the characteristics and causes of relapse amongst leprosy cases in an urban area (Calcutta). *Ind.J.Lepr., 64(2),* p. 169-178, 1992.

In this retrospective study of the 3737 cases of leprosy released from treatment and followed-up during 1975 to 1990, 63 had relapsed giving an overall relapse rate of 1.69%.

The relapse rate was significantly higher in the immunologically unstable N?L (Borderline) cases (2.9%). It was also higher in those who had dapsone monotherapy (1.92%) compared to those had multidrug therapy (1.01%). The relapse rate was higher in the 10 a 29 years age group and among those who became pregnant sugges ing puberty and pregnancy could be risk factors. Males-had a significantly higher relapse rate (2.1%) than females (1.1%) 45.2% of relapses in N (Non-lepromatous) cases occurred within 24 months and 71.4% within 36 months of stopping treatment. In those having monotherapy, 57.1% of relapses occured within 24 months and 76.8% within 36 months. Regularity in treatment did not seem to have much influence on relapses rates.

SUITE, M & GITTENS, C. Attitudes towards leprosy in the outpatient population of dermatology clinics in Trinidad. *Leprosy Review, 63(2),* p. 151-155, 1992.

We interviewed a total of 92 dermatology clinic patients using a brief questionnaire to determine their knowledge, attitudes and beliefs about leprosy. This small survey helped to confirm our suspicions that some knowledge of leprosy is lacking and that much stigma still remains.

SUNDARESAN, T.K. issued involved in the rapid assessment of the leprosy problem. *Leprosy Review, 63(3),* p. 11 s-20s, 1992.

Sample surveys for estimation can prove very expensive and time-consuming because of the enormous sample sizes usualy required.

Where sample surveys have to be undertaken, diagnoses should be limited to detecting a case of leprosy, without attempting skin smears etc. in order to classify by types. Usually enough knowledge is available on the approximate proportion of multibacillary (MB) cases in most communities, and this knowledge could be utilized for estimating the caseload by types of leprosy. Again intensive tracing of nonrespondents could be limited to either males or females depending on convenience, and well-known sex ratios among

patients utilized for deriving estimates for the other sex.

The type of rapid methods of estimation depend on three types of situations: (1) before multidrugtherapy (MDT); (2) 5 years or more after MDT; and (3) less than 5 years after MDT.

In the first situation one or more of the following methods are suggested:

(i) extrapolation from registered cases;
(ii) extrapolation from child prevalence; and
(iii) conducting rapid village surveys.

In situations where MDT has been introduced for 5 years or more the registered cases plus a small number, depending on local experience, would seem to be adequate.

When MDT was introduced less than 5 years before, it is suggested that the prevalence rates be obtained by statistical interpolation drawing on the experience from areas which have had more than 5 years of MDT.]

TEKLE-HAIMANOT, R. et. al. Attitudes of rural people In central Ethiopia towards leprosy and a brief comparison with observations on épilepsy. *Leprosy Review, 63(2),* p.157-168, 1992.

To find out public attitudes toward leprosy a door-to-door survey was carried out in 1546 sampled households in the rural farming community of Meskan and Mareko in central Ethiopia, where the prevalence of leprosy is estimated to be 1:1000. Attitudes toward leprosy were compared with attitudes to epilepsy, studied in a previously performed survey in the same community. Eighty-seven per cent of the respondents were above the age of 25, and 59.5% were females. There were slightly more Muslims (54%) than Christians. The majority of the interviewees (87%) were farmers, with an illiteracy rate of 84%. Ninety-five per cent and 83%, respectively, were not willing to employ or work with a person having the disease. Seventy-five per cent would not allow their children to associate with a playmate suffering from leprosy. Comparative analysis of attitudes in the same community showed that negative attitudes toward leprosy were stronger than those toward epilepsy, particularly with regard to matrimonial associations, sharing of accommodation, and physical contact with an affected person. The reasons for these differences appear to be community's deeply entrenched belief that leprosy is both hereditary and contagious, expressed respectively by 48% and 53% of the respondents. in order to minimize the perpetuation of negative attitudes, there is a need to educate and impress on the population that leprosy is a treatable infectious disease which is not congenitally acquired, and that it is even curable if detected early. In the study reinforces previously proposed suggestions that, in developing countries such as Ethiopia, leprosy care should be integrated into the general health services.

REABILITAÇÃO

ANTIA, N.H. Plastic footwear for leprosy. *Leprosy Review, 61(1),* p. 73-78, 1990.

The anaesthetic foot in leprosy poses the most major problem in the rehabilitation of its patients. Various attempts have been made to produce protective footwear such as the microcellular rubber-car-tyre sandals. Unfortunately these attempts have had little sucess on a large scale because of the inability to produce them in large numbers and the stigma attached to such unusual footwear. While such footwear may be superior to the 'tennis' shoe in protecting the foot from injury by the penetration of sharp objects, it fails to distribute the weight-bearing forces which is the major cause of plantar damage and elceration in the anaesthetic foot. This can be achieved by providing rigidity to the sole, as demonstrated by the healing of ulcers In plaster of paris casts or the rigid wooden clog.

A new type of moulded plastic footwear has been evolved in conjunction with the plastic footwear industry which provides footwear that can be mass produced at a low price and which overcomes the stigma of leprosy. Controlled rigidity is provided by the incorporation of a spring steel shank between the sponge insole and the

hard wearing plastic sole. Trials have demonstrated both the acceptability of the footwear and its protective effects as well as its hard wearing properties.

CHATURVEDI, R.M. & KARTIKEYAN, S. Employment status of leprosy patients with deformities in a suburban slum. *Ind.J.Lepr., 62(1),* p. 109-112, 1990.

In a poor slum area in suburban Bombay, a study of 129 leprosy patients with deformities revealed that only 46% were employed before the appearance of deformities and most of them had lost their jobs after deformities had appeared. Health education on care of anesthetic extremities did not have the desired impact on the patients, many of them had worsening of their deformities during the phase of their employment because they had to take up any kind of work in order to make a living. They were mostly poorly educated and lacked special skills. The only feasible alternative in this kind of situation appears to be a selective community-based rehabilitation of leprosy patients with deformities.

DUERKSEN, F. & VIRMOND, M. Carvable silicone rubber prosthetic implant for atrophy of the first web in the hand., *Leprosy Review, 61(3),* p. 267-272, 1990.

Muscular atrophy of the first web space in the hand is a common finding following ular nerve palsy and this deformity is very stigmatizing among leprosy patients in some countries and cultures.

We present our experience with the carvable soft-silicone rubber block implant to correct this deformity. We discuss the procedure, results and advantages over other techniques.

Fifteen operations were performed at the 'Lauro de Souza Lima' Research Institute, Bauru, Brazil during a period of six years. One complication was encountered due to an implant that was too large. The results were considered good in twelve instances and fair in three.

IYERE, B.B. Leprosy deformities: experience in Molai Leprosy Hospital, Maiduguri, Nigeria. *Leprosy Review, 61(2),* p. 171-179, 1990.

A total of 410 patients (288 males, 122 females) aged between 9 and 60 years with an average age of 32.5 years were assessed for deformities of the eyes, hands and feet. The objectives were to find out the number and types of leprosy deformities in the leprosy population of the hospital, the proportion of those deformed among them and to establish the deformity baseline for the hospital. The study lasted 1 year, 38.78% (26.59% males, 12.20% females) of those investigated had one or more deformities. Apart from plantar and palmar insensitivity which accounted for 17.91% and 17.24% of all deformities, the most frequent deformities were mobile claw hand 12.94%, plantar ulcers 10.78% and palmar ulcers 5.97% respectively. With the exception of eye deformities, males accounted for a higher proportion of all deformities. Hand deformities were the most frequent of the three parts of the body studied. The patient's problems were highlighted and the need for adequate management and self-care were emphasized.

KULKARNI, V.N. et. al. Newer designs in footwear for leprosy patients. *Ind.J.Lepr., 62(4),* p. 483-487, 1990.

Micro-cellular rubber (MCR) foot-wear has been used widely over the past several years for the anaesthetic feet of leprosy. Although MCR has got good shock absorbing and moulding qualities, many tend to reject the foot-wear because of the stigma of the disease which it carries. Two newer models of foot-wear which would meet the demands of anaesthetic sole and avoid the stigma because of their resemblance to foot-wear avalable in the market were tried. Model mark II fulfilled the needs and was acceptable to the patients. Such models must be tried and acceptable and effective foot-wear need to be made avaiable.

PREMKUMAR, R. et. al. Foot soaks for callosities and fissures. *Ind.J.Lepr, 62(4),* p. 478-482, 1990.

A study to assess the effect of soap soaks and plain water soaks on the dry anaesthetic sole of 15 leprosy patiens bearing multiple fissures and callouses is reported. A callous scraper devised by us was found effective. It is recommended that a hypotonic keratolytic solution such as toilet soap or plain water be used for soaking which has the effect of softening the Keratin. It may be better to use soap solution for this purpose.

THAPPA, D.M. et. al. Disability index of hands and feet in patients attending an urban leprosy clinic. *Ind.J.Lepr., 62(3),* p. 328-337, 1990.

189 leprosy patients including 20 from a leprosy colony having disabilities and deformities were graded by the WHO (1960) classification and their disability indices were calculated. Disabilities occurred more frequently in males and the disability index was significantly higher in those with longer duration of the disease and in multibacillary patients. Majority of the disabled patients (82.5%) were manual workers, but the highest disability index was observed in beggars. Irregularly treated and untreated patients had significantly higher disability indices (DI 2.40 and DI 1,40) than those taking regular treatment (DI *1.09). No* correlation was found between severity of disability and occurence of type I and type II reactions. Disabilities of hands and feet occurred with equal frequency.

KARAÇORLU, M.A. et. al. The protective effects of methyl cellulose and conoid shields for lagophtalmos and corneal hypaesthesia in leprosy. *Leprosy Review, 62(2),* p. 201-205, 1991.

Lagophtalmos and corneal hypaesthesia are amongst the most frequently encountered lesions in leprosy and they can give rise to blindness. Many measures (such as eye drops, protective conoid shields, muscle exercises, surgical treatment, etc.) have been used to protect the eyes under such circumstances and this paper examines the protective role of methyl cellulose and conoid shields in 41 patients. All of them had lagophtalmos (5 mm or more) and corneal hypaesthesia. They were divided into three groups. Group one had 15 leprosy control patients (27 eyes) who did not use methyl cellulose or eye shields. Group two had 16 leprosy patients (28 eyes) and they used methyl cellulose and eye shields when they felt discomfort in their eyes. Group three had 10 leprosy patients (17 eyes) and they used methyl cellulose and eye shields regulary. Statistically significant improvement was seen in group three. Further studies on larger groups of patients including the effects of different concentrations of methyl cellulose, on Schirmer test and tear break up time, may be of value.

RAMANATHAN, U. et. al. Psychosocial aspects of deformed leprosy patients undergoing surgical correction. *Lepr. Rev., 62(4),* p. 402-409,1991.

A psychosocial study conducted on 25 randomly selected leprosy patients undergoing corrective surgical procedures for their deformities. High anxiety and depression levels found preoperatively, reduced significantly after operation. Psychiatric assistance is needed for these patients in order to cleartheir psychic aberrations, create awareness, boost morable and to give self-confidence.

Only 50-75% of preoperative expectations were satisfied but that was only in 40% of patients. This call for a preoperative counselling session with the patients to help them reach the realistic goals that they can achieve. They should be told what benefits surgery can offer them and be made aware of the problems which persist after operation, such as anaesthesia and analgesia.

BRANDSMA, J.W. et. al. The international classification of impairments, disabilities and handicaps in leprosy-control projects. *Lepr. Rev., 63(4),* 1992.

The use of a uniform language, wich includes definitions of terms, is very important in the field of health care. It is important to have a common language for educational, research and communication purposes. Classifications can play a major role in the development of uniform reporting and registration systems The purpose of this article is to familiarize leprosy workers with two classifications that are in common use in health care, a classification of diseases and classification used to describe the overall health status of a person, and to relate the 3 terms that are used in the latter classification, impairments, disabilities and handicaps, to leprosy.

GERSHON, W. & SRINIVASAN, G.R. Community-based rehabilitation: an evaluation study. *Lepr. Rev., 63(1),* p. 51-59, 1992.

Leprosy gives rise to two types of stigmatization, one from the disease and its neuropathetic manifestations, with their resultant disability and handicaps, and the other due to social ostracism.

The process of rehabilitation should begin from the moment the disease is diagnosed, and the earlier its detection the better the prognosis for patients.

The family unit to which the patient belongs plays a vital role in his social life, ensuring and enhancing his self-respect and dignity in society, and this fact must be recognized when evolving a strategy for rehabilitation. In no circunstances should a patient be removed from his natural home environment.

It is important that the community is made leprosy conscious and gets more involved in the social assimilation of patients. Communication plays an important role throughout the rehabilitation process. One of the major functions is the removal of the social stigma in the family and in the community and this involves communication skills to ensure interaction between the staff and patients'families and the education of the community.

A highlight of community-based rehabilitation is the excellent rate of repayment of loans by the patients to whom they were made. Also of note is the extent to which former defaulters make repayments due to the continuous rapport and good interpersonal relationship between the staff and patients.

Most of the subjects of this study were drawn from the lower economic strata of society and for them the most essential consideration is to make a living, however meagre. This problem is augmented in the case of leprosy suffers, not only because of the fear and hostility which their disease excites in others, but because of their deformity and handcap. No rehabilitation programme can afford to ignore these factors which so seriously disturb the normal life of patients.

KARTIKEYAN, S. & CHATUVERDI, R.M. Pattern of leprosy deformities among agricultural labourers in an endemic district: A pilot study. *Ind.J.Lepr., 64(3),* p. 375-380, 1992.

A study of 1,338 leprosy affected agricultural labourers in an endemic district revealed that 12% had deformities. The patient's sex, type of disease, duration and educational status seemed to influence pattern of leprosy deformities. The patients continued working despite deformities in order to avoid financial dependence on their family members and loss of dignity.

RAO, S.P. & BHUSARI, P.S. Evaluation of disability knowledge and skills among leprosy workers. *Ind.J.Lepr. 64(1),* p. 99-104,1992.

The leprosy workers' knowledge and skills regarding disability prevention and control were quantified by a specially designed Objective Structured Clinical Examination (OSCE). The scorings were similar and showed no significant difference between supervisors and peripheral workers. It is suggested that the training component of disability control be improved with emphasis on problem-oriented learning.

SHWE, T. Prevalence of colour blindness among patients with leprosy. Ind.J.Lepr., 64(4), p. 483-486, 1992.

Using Ishihara test plates the prevalence of colour blindness was studied on six hundred and ninety-seven leprosy patients and two hundred and ninety-two normal healthy controls. 7.88% of male patients with tuberculoid leprosy, 12.18% of male patients with lepromatous leprosy, and 0.67% of male controls were detected to be colour blind (red-green deficiency or total colour weakness). The differences between the different groups are significant. Among female patients and controls, only one lepromatous leprosy patient was detected to have red-green deficiency. This suggests the possibility of a genetic predisposition to Mycobacterium leprae infection in patients with leprosy.

THAPPA, D.M. et. al. Radiological changes in hands and feet in disabled leprosy patients: A clinico-radiological correlation. Ind.J.Lepr., 64(1), p. 58-66, 1992.

Seventy-six consecutive leprosy patients with disabilities were subjected to radiological examination of hands and feet, and bone changes were found in 63 of them (82.9%). Specific, nonspecific and osteoropotic bone changes were observed in 22.4%, 78.9% and 28.9% of cases respectively. Bone cysts (10.5%), subarticular erosions (10.5%) and enlargement of nutrient foramena (5.3%) were the common specific bone changes whereas bone absorptive changes (59.2%), soft tissue changes (39.5%) and concentric absorption (39.5%) were the most frequent nonspecific bone changes. Specific bone changes were more common in older patients (age 40 years) and nonspecific bone changes correlated with, duration of disease, duration of deformity, and disability index. Osteoporotic bone changes were found to be affected by ageing and severity of disability of hands and feet.

WEBER, M.W. et. al. Results of surgical procedures for the correction of foot-drop and of lagophthalmus due to leprosy. Leprosy Review, 63(3), p. 255-262, 1992.

Leprosy mutilations of the muscles and skeleton can be relieved by reconstructive surgery, but evaluation of the results of these operations is seldom undertaken. Between 1975 and 1984, 59 leprosy patients were operated on at the Marie Adelaide Leprosy Centre, Karachi, Pakistan, for Lagophtahalmus with the transposition of the posterior tibial muscle.

We were able to re-examine 39 patients: tibials posterior transposition was performed 25 times, and temporalis transposition was carried out 33 times; 18 of the 25 patients with the tibials posterior transposition were pleased with the result, 7 were not: 21 patients could extend their feet above the neutral position, 24 of the patients with the temporalis transposition were satisfied, 9 were not: complete closure was demonstrated in 21 eyes; Persistent corneal damage was noted in 15 eyes; 12 of the 23 male patients cared for themselves, 16 lived with their families; 7 of the 8 females patients lived with their families.

The results of the rehabilitation, in relation to the degree of mutilation, are considered satisfactory for a developing country. These surgical procedures give a good result, provided they are followed by intensive physiotherapy.

YAWALKAR, S. et. al. Modulan Gripaids for Leprosy Patients. Int.J.Lepr., *60(2),* p. 250-254, 1992.

Made-to-measure Modulan grip-aids were fitted to 755 articles for 155 patients with hand deformities due to leprosy. The acceptance of the grip-aids was, in general, good. No instance of contact dermatitis or skin irritation was reported These grip-aids facilitated a normal grip with crippled hands, and thus considerably improved the quality of the patient's personal and working life. They increased the patient's self- esteem and self-confidence because he/she could handle everyday objects or tools without the help of others and could do his/her job - an important step toward social and economic rehabilitation.

TERAPÊUTICA

BANERJEE, D.K. & McDERMOTT LANCASTER, R.D. Effect of Simultaneous Administration of Interferon-y and Chemotherapy Against *Mycobacterium leprae* in Experimental Infection In Nude Mice. Int.J.Lepr., 58(4), p.690-696, 1990.

The possibility of synergy between immunotherapy with recombinant interferon-gamma (IFN-y) and chemotherapy with rifampin (RMP) and dapsone (DDS) against Mycobacterium leprae was examined in nude mice. IFN-y alone failed to show any effect on the growth of M. leprae in the nude mouse foot pad. No synergy was demonstrable between DDS, either at 0.0001% or at 0.001%, and IFN-y. A subinhibitory level of RMP with IFN-y was also ineffective, but RMP at 0.006% with IFN-y produced a statistically significant enhancement of killing (26-fold) when compared with RMP at 0.006% only. It should be emphasized, however, that results obtained in the immunodeficient nude mouse model may not be comparable to those which might have been given by lepromatous leprosy patients.

CELLONA, R.V. et. al. Joint Chemotherapy Trials in Lepromatous Leprosy Conducted in Thailand, The Philipines, and Korea. lnt J.Lepr., 58(1), p.1-11, 1990.

Chemotherapy trials in lepromatous leprosy using various combinations of existing antileprosy drugs were conducted jointly by Korea, The Philippines, and Thailand. The general objective of these trials was to determine the most effective and practicable regimen or regimens for field applicalion.

Lepromatous patients were divided into two groups: Group 1 was comprised of new, untreated patients infected with dapsone-sensi *tive Mycobacterium leprae* and Group II consisted of relapsed patients with dapsone-resis-tant disease. Four different regimens were ad ministered to each group for 5 years. Comparison among the regimens was based on antileprotic efficacy, drug safety, acceptability, field practicability, and economic feasibility.

No significant differences were noted among the various regimens as judged by the reduction in the bacterial index (BI), clinical response, and change In biopsy index. Toxicity was seen only in the regimens containing prothionamide and rifampin. The regimens were acceptable to the patients and all were found practical for field use. Clofazimine, even in low doses, was found to suppress the frequency and severity of erythema nodosum leprosum. A multidrug regimen effective against both new and relapsed cases of lepromatous leprosy, whether dapsone sensitive or dapsone resistant, is recommended for field use. Given priority, the cost of the regimens is affordable in the three countries.

CHIPLUNKAR, S.V. et. al. Natural Killer-cell-mediated and Antibody-dependent Cellular Cytotoxicity in Leprosy. Int J.Lepr., 58(2), p.334-341, 1990.

We have assessed the natural killer (NK) cell-mediated) cytotoxicity and antibody-dependent cellular cytotoxicity (ADCC) in the peripheral blood lymphocytes (PBL) from untreated lepromatous leprosy (LL) patients, LL patients on multidrug therapy (MDT) with favorable responses (MDT-R), LL patients clinically classified as nonresponders to MDT (MDT-NR), treated tuberculoid leprosy (TT) patients, and healthy donors. NK cytotoxicity was modulated by treating the PBL with recombinant interferon-alpha (IFN-α±) and recombinant interleukin-2 (IL-2).

The mean percent NK cytotoxicity of untreated LL patients (15 ± 3), treated MDT-R patients (20 ±4), and treated MDT-NR patients (12 ± 4) was significantly lower than that of TT patients (39 ± 6) and healthy donors (37 ± 5). Treatment of effectors with IL-2 or IFN-a enhanced NK cytotoxicity in 5 of 6 untreated LL patients, 6 of 6 treated MDT-R LL patients, 4 of 5 and 3 of 5 treated MDT-NR LL patients, respectively, and 5 of 8 and 3 of 8 treated TT patients, respectively.

Although PBL from TT patients showed

initial NK activity comparable to that of healthy donors, fewer TT patients showed modulation of NK activity by IL-2, and IFN-α to a lesser extent. The ADCC activity was lower in untreated LL patients compared to treated patients, while TT patients had normal ADCC activity. The results indicate that although LL patients show lowered spontaneous cytotoxicity, it can be modulated favorably by lymphokines.

CHOPRA, N.K. et. al. A study of relapse in paucibacillary leprosy in a multidrug therapy project, Baroda District, India. Lepr. Rev., 61(2), p.157-162, 1990.

In order to judge the value of therapeutic regimens in paucibacillary leprosy, knowledge of incubation time of relapses is essential, as this will define the length of time patients have to be followed up after treatment has been stopped. The prospective study of relapse includes paucibacillary cases of leprosy belonging to a nonlepromatous group consisting of tuberculoid, neuritic and indeterminate. Data are presented on the incubation time of 21 relapses after multidrug therapy in Baroda district; 76.19% of relapses occur during the first 2 years. This figure is most important in the analysis of results of drug trials in paucibacillary leprosy. This figure should also be relevant to regimens including drugs that are more bacteriocidal than dapsone, since the bacteriocidal activity has a bearing on the minimal necessary duration of treatment, but not on the incubation time of relapses.

With the introduction of bactericidal drugs e.g. rifampicin in multidrug therapy, the incidence of relapse are very low, hence relapse rates fall down to a very low level after multidrug therapy. Our study shows a mean relapse rate of 0.19% after multidrug therapy. Factors associated with the occurrence of relapse are discussed.

DHOPLE, A.M. & ORTEGA, I. An In vitro culture method for screening new drugs against Mycobacterium leprae. Ind.J.Lepr., 62(1), p.66-75, 1990.

An in vitro culture system has been devised fort he maintenance and growth of *M. leprae* in a cell-free medium. Cells from four-week old cultures could be transferred to fresh medium and growth was observed in subcultures. Using this system, the M.I.Cs of dapsone and rifampicin were determined. Dapsone at 25 ng/ml and rifampicin at 300 ng/ml completely inhibited the growth of host-grown as well as in vitro-adapted M. leprae. It was further shown that the effects of both the drugs were bactericidal; this observation was subsequently confirmed using mouse foot pad technique.

DHOPLE, A.M. et. al. Effect of Brodimoprim on Mycobacterium leprae in vitro and in mouse foot-pads. Ind.J.Lepr., 62(1), p.76-86,1990.

The new in vitro screening system reported earlier was adopted to determine anti-*M.leprae* activity of a dihydrofolate reductase inhibitor, brodimoprinm, and the results were compared with those obtained using mouse footpad technique. Even though the MIC of brodimoprim against M. leprae was very high compared to other commonly used anti-leprosy drugs, in combination with dapsone it showed a remarkable synergistic acticity in inhibiting the growth of M. leprae at concentrations much lower than the MICs of each of the drugs used singly. Similar effects were also demonstrated in mouse footpad experiments.

GROSSET, J.H. et. aI. Clinical Trial of Pefloxacin and Ofloxacin in the Treatment of Lepromatous Leprosy. Int.J.Lepr., 58(2), p. 281-295, 1990.

Twenty-one previously untreated lepromatous patients were randomized Into two groups and treated with either 800 mg pefloxacin (PEFLO) or 400 mg ofloxacin (OFLO) once daily. The trial consisted of two parts: monotherapy from day 0 to day 56; and combined with the World Health Organization multidrug therapy (WHO/ MDT) regimen for multibacillary (MB) leprosy from day 57 to day 180. Four patients were removed

from the trial because the organisms recovered from their pretreatment biopsies failed to infect mice. Among the remaining 17 cases, four (23.5%) had primary resistance to dapsone but all of them were susceptible to rifampin. The initial (day 0) proportion of viable organisms, as measured by mouse foot pad inoculation, varied tremendously from patient to patient despite randomization during admission. Definite clinical improvement was noticed in virtually all patients after 22 doses of treatment with either PEFLO or OFLO. A significant fall in the morphological index (MI) occured as early as after 8 doses of PEFLO or after 22 doses of OFLO; the bacterial load also showed a moderate degree of reduction during the period of monotherapy. Although single-dose PEFLO or OFLO displayed only a modest degree of bactericidal effect against *Mycobacterium leprae,* about 99.9%, or 4 logs, of organisms viable on day 0 were killed by 22 doses either PEFLO or OFLO. No significant difference In the therapeutic effect was detected between the two regimens. During PEFLO or OFLO monotherapy, except in one patient (case monotherapy, except in one patient (case n° 10), the side effects were few and mild. Case nº 10 developed a psychic disorder after 27 days of PEFLO monotherapy, presumably due to the treatment with PEFLO. All of the patients tolerated the period of combined therapy extremely well, although some asymptomatic and transient laboratory abnormalities were observed. Because both PEFLO and OFLO displayed rapid bactericidal activities in human leprosy and were wIl tolerated by the patients, further clinical trials and field trials in evaluating the therapeutic effects of combined regimens containing both rifampin and PEFLO or OFLO are being organized. Since this is the first clinical trial in leprosy employing nude mice in combination with normal mice, for monitoring the therapeutic effects of antimicrobials, the advantages, limitations and appropriate timing In using nude mice are discussed.

GRUGNI, A. et. al. Relapses in Paucibacillary Leprosy After MDT-A Clinical Study. *Int. J.Lepr., 58(1),* p.19-24, 1990.

A study was undertaken in a field-based project to assess the incidence and clinical profile of relapses occurring in paucibacillary leprosy patients after adequate doses of multidrug therapy (MDT). Of the 1509 paucibacillary patients who had received not less than 6 doses of MDT (WHO regimen), 85 relapsed; a relapse rate of 5.63% (17.5/1000 person years at risk). These relapses included 12 cases with features of reversal reaction. Seventy-nine percent of the patients relapsed with skin lesions. The relapse rate was higher in borderline cases and in those with more lesions, and it was lower in those who had received dapsone for at least 6 months after cessation of MDT. Seventy-four percent of the relapses were detected between 7 and 24 months of follow up. We feel that uniform clinical criteria should be formulated for the diagnosis of relapse. Individualization of therapy, rather than adhering to a fixed duration of MDT, would be likely to achieve satisfactory cure rates and fewer relapses.

JADHAV, V.H. et. al. Thalidomide in type-2 lepra reaction - a clinical experience. *Ind.J.Lepr., 62(3),* p. 316-320, 1990.

A clinical experience of using thalidomide in type-2 lepra reaction (ENL) in 90 male patients - 57 with lepromatous leprosy (LL) and 33 with borderline Iepromtatous leprosy (BL) - is described. All the patients responded well although some took a longer time to improve. No major side effects were observed except for giddiness in 10 and gastrointestinal upsets in 7 patients. Thalidomide thus appears to be a very effective drug in the treatment of severe type-2 lepra reaction and apart from its historically well documented embryopathic effects, does not seem to have any other serious side effects in the patients under study.

KAR, P.K. et. al. Clinico-histopathological study of multidrug therapy in indeterminate leprosy. *Ind.J.Lepr., 62(1),* p.98-103, 1990.

A Study was undertaken in 42 patients with indeterminate leprosy, to evaluate the efficacy of multidrug therapy (MDT) in Indeterminate

leprosy for 12 months. The main clinical finding was a single hypopigmented macule in 31 (73.8%) of the 42 cases. Histopathologically all cases showed lymphohistiocytic infiltration around skin appandages and dermal nerves. At the end of six months of MDT all the cases were evaluated clinically and 33 (85.5%) showed marked improvement or total inactivation while the lesions were still active clinically in 21.4% cases. Histopathological examination of lesions in 30 patients showed complete histological resolution in 9 cases only. At the end of one year of treatment it was found that 28 cases (66.3%) had become inactive and only 2 (4.7%) were found to be still active.

KAUR, I. et. al. Effect of Clofazimine on eye in multibacillary leprosy. *Ind.J.Lepr., 62(1),* p.87-90, 1990.

Seventy-six patients of multibacillary leprosy received ciofazimine as part of multidrug therapy (MDT) for periods ranging between 6 and 24 months. Complete ocular examination including slit lamp microscopy and examination of tears was carried out in all these patients. Reddish brown conjunctival and corneal pigmentation was seen in 46% and 53% of the patients respectively. Clofazimine crystals in tears were found in 32% of the patients. Apart from this no other eye changes or symptoms attributable to ciofazimine were observed.

LECHAT, M.F. et. al. Selection of MDT Strategies Through Epidemiometric Modeling. *Int.J.Lepr., 58(2),* p.296-301, 1990.

The epidemiometric model of leprosy, built on Polambakkam, India, data, is used to compare the impact on incidence of dapsone and different multidrug therapy (MDT) strategies. The simulations show that generalization of MDT could have a dramatic impact on transmission of the disease. Relapses after MDT, although important from an individual point of view, have a negligible influence on the incidence. Introduction of MDT requires investments that, during the first few years of the program, are much greater than for dapsone monotherapy. These are, however, rapidly absorbed due to the rapidly declining number of new cases, particularly when MDT is not limited to multibacillary cases but is administered to all patients.

NAIK, S.S. et. al. Pattern of drug compliance in leprosy patients attending urban centres-a longitudinal study. *Ind.J.Lepr., 62(3)* p.305-309, 1990.

The pattern of drug compliance in 485 leprosy patients attending urban leprosy centres in Bombay was studied for 2 years. The study subjects included 113 patients with paucibacillary leprosy under dapsone monotherapy, 241 patients with paucibacillary leprosy under multidrug therapy and 131 patients with multibacillary leprosy under multidrug therapy. Their urine samples had *been* checked at least 6 times during the 2 years by DDS tile test at the time of their clinic attendance. The urine test results were not disciosed to the patients, but patients showing negative results were counselled about the need for regular drug intake.

35% of the patients were "Regular through out", 13% were "Irregular through out" and the other 52% who "Tended to be irregular" in their drug intake become "Regular" after counselling. Regularity in drug compliance was better in patients on multidrug therapy than in those on monotherapy. It is suggested that periodic testing of urine for checking for regularity of drug intake and subsequent counselling of patients should be made a routine practice to maintain drug compliance at a high level.

N'DELI, L. et. al. Effectiveness of Pefloxacin in the Treatment of Lepromatous Leprosy. *Int.J.Lepr., 58(1),* p.12-18, 1990.

As a first clinical trial of a fluoroquinolone derivative in leprosy, ten previously untreated lepromatous leprosy patients, about two fifths of them with primary dapsone resistance but all susceptible to rifampin, were treated with pefloxacin 400 mg twice daily for 6 months. Defi-

nite clinical improvement was observed in all ten patients as early as 2 months after beginning treatment, and the morphological index was also drastically decreased to the baseline during the same period. The rapid bactericidal effects, as measured by serial mouse foot-pad inoculations, were demonstrated to the extent that about 99% of the bacilli were killed during the first 2 months of treatment. However, the bacterial load, in terms of the bacterial index and the number of acid-fast bacilli per mg of tissue, of the patients was only moderately reduced. The side effects were mild, and the patients tolerated the treatment well.

PATTYN, S.R. et. al. Evaluation of five treatment regimens, using either dapsone monotherapy or several doses of rifampicin in the treatment of paucibacillary leprosy. *Leprosy Review, 61(2),* p.151-156, 1990.

The objective of the present study was to define short-course treatment regimens for PB leprosy and to compare them with the 'classical' dapsone treatment and the WHO-PB regimen. Five treatment regimens were studied and evaluated by the histologic evolution. The regimens were:(1) dapsone 100 mg daily, non-supervised for 3 years; (2) RMP 900 mg supervised, once weekly, 8 doses; (3) idem 12 doses; (4) RMP 600 mg, once monthly, supervised, 6 doses and during this treatment dapsone 100 mg daily unsupervised; (5) RMP 600 mg together with dapsone 100 mg daily, supervised for 6 days. For each of these regimens there were between 114 and 195 person-years of follow-up.

Results are comparable for the 5 treatment regimens, and reach 65-75% cure rates at 36 months and 80-90% at 48 months after the start of therapy. The relapse rate for all groups is about 0.5% per year. The difficulty fort he diagnosis of relapse in PB leprosy discussed.

It is concluded that treatment of PB leprosy can be relatively simple but that a relatively long time is needed to evaluate its effect.

RAJAH, M.A. Eye in Multi Drug Therapy. *Ind.J.Lepr., 62(1),* p.33-38, 1990.

Eyes of 237 multibacillary leprosy patients on Multi Drug Therapy were studied for a minimum period of 2 years and maximum period of 4 years. Ocular status remained unaltered in 75%, improved in 16% and there was worsening in 9% during the study period. The changes in those worsened were of microscopic nature and seen mostly among those with long duration of disease and among reactors.

THOMAS, A. et. ai. Controlled Clinical Trial of Two Multidrug Regimens with and without Rifampin in Highly Bacilliferous BULL South Indian Patients: A Five-year Report. *Int.J.Lepr., 58(2),* p.273-280, 1990.

A controlled clinical trial of two multidrug regimens in multibacillary lepromatous and near-lepromatous patients with a bacterial index (BI) of 2.5 or more was conducted. Patients were randomly allocated to either a two-drug regimen of dapsone plus ciofazimine for 60 months or a four-drug regimen of rifampin, isoniazid, dapsone, and ciofazimine for the first 3 months and ciofazimine plus dapsone fort he next 57 months. There was no difference between the rifampin and nonrifampin regimens with respect to the clinical improvement or bacteriological status of the patients at 60 months. Reactive states and neuritis were observed to be equal in the two patient groups.

ZEIS, B.M. et. al. The influence of structural modifications of dihydrophenazines on arachidonic acid mobilization and superoxide generation by human neutrophils. *Leprosy Review, 61(2),* p. 163-170, 1990.

In this study the effects of nine dihydrophenazine derivatives, relative to ciofazimine (B663), on the N-formyl-L-methionylL-leucyl-L-phenylalanine (FMLP) stimulaled release of superoxide anion and on the spontaneous generation of arachidonic acid by human neutrophils were investigated. Previous findings that the pro-oxidative activity of the agents depended largely on the substituion in position 2 of the phenazine molecule and on chlorination in the paraposition of the phenyl and anilino rings were confirmed. Only

riminophenazines, but not aposafranone derivatives or the imidazophenazine B621, could enhance superoxide release from activated neutrophils. The lack of chlorination of the phenyl and anilino rings could be compensated for by chlorine substitution in position 7 of the phenazine core.

The priming effect of the agents on FMLP stimulated superoxide generation was completely prevented by the phospholipase A_2 inhibitor *4-p*-bromophenacyl bromide. Furthermore pro-oxidative activities correlated ciosely with a stimulatory effect of the agents on arachidonic acid release. It was therefore concluded that dihydrophenazine derivatives with pro-oxidative properties can prime neutrophils for FMLP-stimulated superoxide release by modulation of phospholipase A2 acitivity.

ABRAHAM, B. et. al. Rifampin in Drug-incorporated Diet: Effect of Duartion and Temperature of Storage Relevance to Drug-susceptibility Testing in Mice Inoculated with *M.leprae. Int.J.Lepr., 59(1),* p. 68-75, 1991.

This paper is in two parts. Plasma concentrations of rifampin were assayed at 11 time points in 24 hr in mice fed one of three dosages of rifampin, either by gavage or by dietary incorporation. The drug-mixed diets had been stored for a maximum of 3 weeks at 4°C or at room temperature (30°C-35°C). The peak concentration of rifampin produced by gavage was approximately 1 1/2 times higher than the maximum plasma concentration of the corresponding dosage in fresh diet. Plasma concentrations decreased with the increasing duration of storage of the drug-mixed diet, irrespective of whether the diet was stored at 4°C or at room temperature. This decrease was less when the diet was stored at 4ºC than at room temperature.

Drug levels were also assayed in anolher set of mice selected from ongoing drug-susceptibility experiments; these mice were fed a rifampin-incorporated diet stored at room temperature. The plasma concentrations in these mice, assayed at the time of foot pad harvest, were generally higher than in the 24-hr experiment. The harvest results from these mice were compared with the harvest results from a third set of mice, also from ongoing drug-susceptibility experiments, but fed a rifampin-mixed diet stored at 4ºC. Multiplication of *Mycobacterium Ieprae* in mouse foot pads was prevented by rifampin mixed in the diet at a dosage of z 0.003%, whether stored at room temperature or at 4°C.

This study defines the criteria for rifampin resistance of *M. leprae* in the mouse foot pad by discussing methods of rifampin administration, the plasma concentration curves that result, and the effect of these on the multiplication of the organisms in the mouse foot pad.

BECX-BLEUMINK, M. Allocation of Patients to Paucibacillary or Multibacillary Drug Regimens for the Treatment of Leprosy A Comparison of Methods Based Mainly on Skin Smears as Opposed to Clinical Methods-Alternative Clinical Methods for Classification of Patients. *Int.J.Lepr., 59(2),* p.292-303, 1991.

This paper reports on the experience with classification of patients at the All-Africa Leprosy and Rehabilitation Training Centre (ALERT) in the Shoa Province in Ethiopia. Classification on clinical grounds is compared with classification which is primarily based on the result of skin-smear examinations. In addition, possible alternative clinical methods for the allocation of patients to the multidrug therapy (MDT) regimens are discussed.

The analysis includes 1525 new patients. In 730 patients classified clinically as paucibacillary (PB), this classification was not confirmed by skin-smear results in only 1.5%; whereas in 795 patients classified clinically as multibacillary (MB), the classification was not confirmed in 21.1%. Possible reasons, notably for the latter discrepancy, are discussed.

Based on an assessment of the correctness of the diagnosis and the most probable classification, it was found that if classification had been based on the skin-smear results, 9.3% of the 795 patients classified as MB would have been classified incorrectly as PB. Classification based on clinical signs resulted in incorrect classification, MB instead of PB, of 8.7% of the 795

patients. Over-classification of MB patients, which was found to be supervisor related, is open to improvement by a strict application of clinical criteria for classification. The experience in the ALERT leprosy control program shows that classification which is based on clinical signs may, in particular, result in some PB patients being classified as MB, while classification based on the results of skin-smear examinations is more likely to result in some MB patients being classified as PB. It was concluded that, provided a number of requirements aimed at limiting the number of misclassified patients are introduced, patients can be classified based on clinical signs and, hence, in the absence of skin-smear services for routine classification purposes.

BECX-BLEUMINK, M. Experience with WHO-reconnnended Multidrug Therapy (MDT) for Multibacillary (MB) Leprosy Patients in the Leprosy Control Program of the All Africa Leprosy and Rehabilitation Training Center in Ethiopia: Appraisal of the Recommended Duration of MDT for MB Patients. *Int. J.Lepr., 59(4),* p. 558-568,1991.

During 1981 a World Health Organization Study Group recommended that multibacillary (MB) leprosy patients should be given multidrug therapy (MDT) for at least 2 years and, wherever possible, until skin-smear negativity. This paper reports on the experience with MDT for MB patients under routine field conditions in the leprosy control program of the All Africa Leprosy and Rehabilitation Training Center (ALERT) in the Shoa Region of Ethiopia. The period of MDT to reach skin-smear negativity was evaluated for 348 new MB patients. Only 31.6% of these patients could be released after 26 four-weekly doses of MDT, and 19.8% needed over 5 years of MDT. The average period of MDT to reach skin-smear negativity was estimated at about 4 years. Of 3343 patients of cohorts which, almost exclusively, consisted of patients treated with dapsone before MDT, 72.8% were released after 26 four-weekly doses of MDT; whereas of 712 patients of cohorts which mainly included new patients, only 23.5% were released. It was estimated that if MDT would be stopped, regardless of skin-smear results, after 26 four-weekly doses of the drugs collected within a period of 3 years, about 80% of the patients would complete treatment. The operational problems with continuation of MDT until skin-smear negativity are discussed.

Although as yet it has not been proven by study results that after 2 years of MDT the relapse rate will be low, the available knowledge indicates that this is likely to be the case. Based on a) probability, b) the finding that 2 years of MDT can be maintained in the majority of the patients, and c) the operational difficulties with the continuation of MDT until skin-smear negativity, it is recommended that MDT should be limited to 2 years. MDT of limited and fixed duration will facilitate the implementation and expansion of the treatment in parts of the world where most patients are not yet benefitting from this treatment.

BLOK, L.M. et. al. A retrospective study on seven years of multiple drug treatment for paucibacillary and multibacillary leprosy, in Bayara General Hospital, Nigeria. *Leprosy Review, 62(2),* p.193-200, 1991.

In Bauchi State, Nigeria, a retrospective study was carried out among 973 patients on multidrug therapy (MDT), multibacillary (MB) and paucibacillary(PB), and 118 patients on a dapsone-ciofazimine therapy. These patients were registered between January 1983 and September 1989. Clinical results and the problem of defaulting were investigated.

The most important conclusions drawn are: although relapses occur, MDT-PB can be a valuable treatment; health education, shorter duration of treatment and permission to come less often lower the default rate, but in spite of this, the distance between home clinic remains a problem.

BOERRIGTER, G. et. ah Four-Year Follow-up Results of a WHO -recommended Multiple-drug Regimen in Paucibacillary Leprosy Patients in Malawi. *Int.J.Lepr., 59(2),* p. 255-261, 1991.

An evaluation of a World Health Organization-recommended multidrug therapy (WHO/MDT) in 499 paucibacillary leprosy patients is described. Patients were followed for 48 months after completion of treatment. Overall relapse rates after treatment were found to be 6.5 per 1000 person years (95% confidence interval 3.4-11.4). There were 12 relapses. A relative lack of cell-mediated immunity, as suggested by number of lesions, clinical classification and lepromin test results, and poor compliance with the dapsone component of WHO/MDT, appeared to be associated with a marginally increased risk of relapse. Severe type 1 reactions after completion of treatment occurred in 17 (3.5%) patients, 15/17 during the first 12 months of follow-up. Overall, 12 (2.5%) patients developed new disabilities during or after WHO/MDT.

BYRD, S.R. & GELBER, R.H. Effect of dapsone on haemoglobin concentration in patients with leprosy. *Leprosy Review, 62(2),* p.171-178, 1991.

Haemolysis and frank anaemia from dapsone therapy of leprosy has been long recognized. However, the frequency and severity of this side-effect have not been well documented. We report herein a retrospective analysis of the effect of daily dapsone (generally 100 mg/day) on the haemoglobin concentration of 100 leprosy patients undergoing initial chemotherapy. The average haemoglobin was found to fall significantly by almost 2 g/dl, from 14.25 ± 1.27 g/dl to a nadir of 12.31 ± 1.61 ($P < 0.001$). Eighty-three percent of patients had a fall of haemoglobin concentration of 1 g/dl or more, while in 16% of patients the haemoglobin fell z 3 g/dl. Increasing age was found associated with an increased magnitude of dapsone-related haemolysis ($P<0.004$). Decreasing the daily dose of dapsone was associated with an increased haemoglobin concentration ($P< 0.001\%$). We have concluded that dapsone commonly resulls in not only haemolysis but a significant decrease in haemoglobin concentration. This may have serious clinical implications, especially in endemic areas, where, owing to nutrition, malaria, and intestinal parasitism, the haemoglobin concentration is already compromised.

CARTEL, J-L. et. al. Longitudinal study on relapses of leprosy in Polynesian multibacillary patients on dapsone monotherapy between 1946 and 1970. Leprosy Review, 62(2), p.186-192, 1991.

Between 1946 and 1970, 295 new leprosy patients were detected in French Polynesia, of whom 145 were multibacillary. Of these 145, put on dapsone monotherapy, 131 reached bacteriological negativity in a period of time ranging from 2 to 12 years (average 4.72 years) and were followed-up for a period of time ranging from 19 to 43 years (median follow-up period after bacteriological negativity: 18 years). Among the 131 patients, 36 relapses were detected, the first one 4 years after bacteriological negativity and the last one 26 years after. The crude relapse rate was 27.5%, the risk of relapse was 1.39 per 100 patient years and the cumulative relapse probability, calculated using the lifetable method, reached 0.38 ± 11 by year 31 of the study. From these findings one may assume that at least in French Polynesia, one-third to one-half of multibacillary patients put on dapsone monotherapy would relapse if still present 36 years after bacteriological negativity. Such results re-emphasize the need for leprosy patients to be treated with multidrug therapy as recommended by WHO.

CHATURVEDI, V. et. al. On the Value of Sequential Serology with a *Mycobacterium leprae*-specific Antibody Competition ELISA in Monitoring Leprosy Chemotherapy. *Int.J.Lepr., 59(1),* p.32-40, 1991.

The *Mycobacterium* lleprae-specific antibody assays-a serum antibody competition test

(SACT-ELISA) for the epitope on the 35-kDa protein, and an enzyme immunoassay for the disaccharide epitope of phenolic glycolipid-I (PGDS-ELISA)- were evaluated as tools for the serological monitoring of chemotherapy in 20 lepromatous and 6 tuberculoid leprosy patients. In addition to estimates for *M.* leprae-specific antibodies, assessments of the bacterial index (BI) and clinical activity of the disease were also carried out prospectively in these patients on two to four occasions over a period of 19 months. In most cases, a decline in the BI, clinical scores, and antibody levels was observed during the course of treatment. The relative rate of decline was steepest and least variable with the SACT-ELISA, followed by the PGDS-ELISA and the BI. In some patients who showed a static or even an increased BI, despite marked clinical improvement, the antibody levels decreased. These data indicate that, unlike the BI, there is a greater dependence of specific antibody levels on the viability of *M leprae.* This, combined with the fact that antibody titers would reflect the antigen load in the whole body, makes *M.* leprae-specific serology a promising tool for monitoring chemotherapy in leprosy patients.

CONSTANT-DESPORTES, M. et. al. A Case of Relapse with Drug-susceptible *M.leprae* after Multidrug Therapy. *Int.J.Lepr., 59(2),* p. 242-247, 1991.

A male bom in 1930 was diagnosed as smear-positive borderline leprosy in 1971, and was treated with dapsone and/or sulfamethoxypyridazine from 1972 to 1980 with clinical improvement. However, new skin lesions with smears strongly positive appeared in August 1980, and he was diagnosed as having downgraded to lepromatous (LL) leprosy, but the bacilli recovered from the skin biopsy were fullysusceptible to both dapsone and rifampin by mouse foot pad technique. Between 1981 and 1983, the patient was treated with 24 months of rifampin 600 mg and dapsone 100 mg daily, supplemented with prothion-amide 500 mg daily during the initial 3 months, and his skin lesions gradually improved during treatment with the combined regimen. Afterward, the patient was kept under surveillance without treatment. From 1984 to 1986, his skin smears were negative, and no bacilli could be found from a skin biopsy taken in 1985. Then in 1987, 52 months after stopping treatment, new skin lesions appeared with a high concentration of *Mycobacterium leprae* (2 x 10^9/mg tissue). The drug-susceptibility test again demonstrated that the organisms were fully susceptible to both dapsone and rifampin. Apparently the relapse was due to remultiplication of drug-susceptible persisters.

DHOPLE, A.M. et. al. In vitro and in vivo interactions of drugs used in multidrug therapy in leprosy. *Ind.J.Lepr., 63(2),* p.166-179,1991.

Interactions of different drugs commonly used In multiple drug therapy were evaluated using both in vitro culture (cell-free as well as macrophage) system and mouse footpad. No additive effects were obtained in the in vitro system when dapsone was combined with either rifampicin or ciofazimine, while a strong antagonism was observed when ciofazimine was combined with rifampicin but not with rifabutin. In the mouse footpad system, a strong synergism was obtained when clofazimine was combined with either rifampicin or rifabutin, but significant antagonism was observed with the combination of clofazimine and dapsone.

DIETZ, M. et. al. Intrabacterial Sodium-to-Potassium Ratios and ATP Contents of *Mycobacterium leprae* from Ofloxacin-treated Patients. *Int.J.Lepr.,59(4),* p. 548-557, 1991.

In a clinical trial including 17 multibacillary leprosy patients the in vivo effectiveness of ofloxacin on *Mycobacterium leprae* was tested via mass spectrometric determination of intrabacterial ratios of the concentrations of the sodium and potassium ions of individual organisms and of the ATP content per 10^9 bacteria isolated from skin biopsies. After 3 months of treatment, the in vivo drug effect could be determined with at least one of the two methods in 14 cases. Both methods revealed

that in two cases the bacteria definitely did not respond to a 3-month ofloxacin monotherapy (200 mg twice daily). In three further cases a nonresponse of the M. leprae organisms was suspected from the mass spectrometric measurements. In the responder cases, the M. leprae were severely impaired. From the intrabacterial cation ratios the percentage of viable organisms averaged over all untreated biopsies was determined to be 58% and the percentage-killing during the first 3 months of treatment was 72%.

EKAMBARAM, V. & RAO, M.K. Relapse rate in paucibacillary leprosy patients after multidrug therapy in north arcot district. Ind.J.Lepr., 63(1), p. 34-42, 1991.

Surveillance data from 14,227 paucibacillary (PB) patients who had been released from treatment one year earlier, after completing multidrug therapy (PB regimen) for 6 to 12 months, were analysed to assess relapse rates and the influence of three variables, viz., number of lesions, nerve involvement and duration of treatment. The overall relapse rate at one year of surveillance was acceptably low at 0.34%. Relapse rates were about four times higher when there were many (4-9) lesions, or, when nerve was involved (0.80% cf 0.20%). Extending the duration of treatment beyond 6 months did not reduce the relapse rates significantly in the high risk groups. Detection of PB cases early, before these risk factors become operative, and treating them with MDT would appear to be the best strategy to minimize relapse rates.

FFYTCHE, T.J. Residual sight-threatening lesions in leprosy patients completing multidrug therapy and sulphone monotherapy. *Leprosy Review,* 62(1), p. 35-43, 1991.

An analysis of data derived from standardized surveys of the ocular findings in cross-sections of the leprosy population in 23 areas is presented. It shows that 24.3% of the patients completing multidrug therapy and 32.9% of those completing sulphone monotherapy have ongoing eye problems which have the potential to lead to blindness or severe visual impairment. Most of the ocular complications involve the lids, cornea and anterior uveal tract, but a significant proportion of patients had cataract threatening vision.

If left unsupervised, many of these patients will develop major visual problems which could have been avoided. It is Important that completion of systemic leprosy therapy should not be regarded as a guarantee that the eyes are safe, and that regular ocular supervision should be continued long after the patient has been classified as 'cured'.

KATOCH, K. et. al. Clinical and Bacteriological Progress of Highly Bacillated BL-LL Patients Discontinuing Treatment After Different Periods of MDT. *Int.J.Lepr., 59(2),* p.248-254, 1991.

Highly bacillated lepromatous patients (BULL) with an initial bacterial index (BI) of 4 to 6 + are being treated with a modified World Health Organization-recommended multiple-drug therapy (WHO/MDT) regimen consisting of rifampin 600 mg once a month, ciofazimine 100 mg on alternate days, and dapsone 100 mg daily. The clinical and bacteriological profiles of the patients who had discontinued treatment at different durations have been compared with patients who took the same treatment until attainment of smear negativity. All six of the patients who had discontinued treatment at 12-18 months had worsened clinically and bacteriologically, and viable bacilli could be demonstrated in those tested for ATP. In four patients who had stopped treatment at 24-30 months, the BI continued to fall and there was no clinical or bacteriological worsening in 1 to 2 years of follow-up. The fall in the BI in five cases who had discontinued treatment at 36-44 months was comparable to those on continuous treatment, and there was no worsening. These observations indicate that with the conventional MDT regimen it is not advisable to stop treatment at 12 and 18 months. It appears that treatment should be continued for at least 2 years, and longer in the untreated highly bacillated cases. Prospective

clinical trials with a sufficient number of cases and long-term follow-up need to be carried out to ascertain the optimum duration.

MATHAI, R. et. al. Fixed Duration MDT in Paucibacillary Leprosy. *Int.J.Lepr., 59(2),* p.237-241, 1991.

The World Health Organization (WHO) has recommendcd a fixed duration of multidrug therapy (MDT) for paucibacillary leprosy which is currently widely implemented in India. A clinico-pathological study was initiated in 1984 to assess the efficacy of this regimen. The clinical and histological responses of the patients to MDT were assessed at the end of 6 months, when their treatment was stopped, and at 21/2 years, when they were released from surveillance, and compared with the responses of a matched patient group to conventional dapsone (DDS) monotherapy during the same period. Of 28 patients who completed the MDT schedule, there was less than 60% improvement in 33% of them when treatment was stopped at the end of 6 months and in 20% of them at the end of 21/2 years. Of 26 patients receiving DDS monotherapy, 37% showed less than 60% improvement at the end of 6 months but only 8.8% had less than 60% improvement at 21/2 years. It is concluded that MDT for paucibacillary leprosy as recommended by WHO may not have a major advantage over DDS monotherapy, since about 20% of those patients on MDT continue to have evidence of active disease when discharged from surveillance.

PANDIAN, T.D. et. al. Risk of relapse among non-lepromatous patients released from treatment after dapsone monotherapy. *Leprosy Review, 62(3),* p. 288-296, 1991.

Information on 14,625 non-lepromatous patients released from treatment after dapsone monotherapy and followed up to a maximum of 15 years at the ILEP project. Dharmapuri, India, was analysed to study the pattern of relapses. The overall relapse rate was 5/1000 person years. Males had a higher relapse rate than females. The risk of relapse increased with age, number of lesions and duration of treatment. The risk for relapse remained constant over several years after release from treatment. Even throuh the absolute risk for relapse after MDT may be different, the pattern of relapses and the factors affecting it may be similar to what has been shown in this study.

PATTYN, S.R. *Anti-Mycobacterium leprae* Activity of Several Quinolones Studied in the Mouse. *Int.J.Lepr.,* 59(4), p. 613-617,1991.

The *anti-Mycobacterium leprae* activity of several fluoroquinolones (A-56619, A-56620, ofloxacin, fleroxacin, lomefloxacin, temafloxacin, tosufloxacin, and PD-117596) was studied in the mouse. In a dosage of 150 mg/kg administered daily, A-56619 is active and A-56620 is inactive against *M. leprae.* Ofloxacin administered daily for 2 weekes at 300 mg/kg is bactericidal. The minimal effective dose of PD-117596, lomefloxacin and temafloxacin is less than 37.5 mg/kg. When administered at 300 mg/kg at monthly intervals temafloxacin, PD-117596, and ofloxacin are bacteriostatic; while fleroxacin and lomefloxacin are bactericidal. Tosufloxacin is less active than the other quinolones included in the present study.

PATTYN, S.R. et. al. A controlled therapeutic trial in paucibacillary leprosy comparing a single dose of rifampicin with a single dose of rifampicin followed by one year of daily dapsone. *Leprosy Review, 62(2),* p. 179185, 1991.

The cure rates of two treatment regimens in PB leprosy were compared in a prospective randomized trial: treatment U consisting of a single dose of rifampicin 40 mg/K bodyweight, and treatment A of rifampicin 1500 mg in a single dose, followed by one year of daily dapsone 100 mg. In patients with a BI=0, the cure rates evaluated on the basis of histopathology of skin biopsies, were identical for the two regiments but in patients with a BI=1, cure and relapse rates were unacceptable.

For this reason and particularly the need to separate patients on the basis of the BI in skin biopsies, the single dose regimen does not appear to be suited wide-scale application.

RAMESH, V. et. al. Multibacillary Leprosy Presenting as a Solitary Skin Lesion; Report of Three Cases and Its Significance in Control Programs. *Int. J.Lepr., 59(1)* p.1-4, 1991.

Three patients with solitary skin lesions showing the cardinal signs of leprosy were seen and clinically classified among the paucibacillary cases. Initially, they were treated with two drugs (rifampin and dapsone) as recommended by the WHO Expert Committee. On the first visit of their follow-up, they were seen to be histopathologically either in the borderline (BB) or borderline lepromatous (BL) group, and acid-fast bacilli were demonstrated in the sections. Later they were put on three drugs (rifampin, dapsone and ciofazimine) as given for multibacillary cases, and therapeutically they also behaved like bacilliferous leprosy. Such cases are rare and the reasons for the ocurrence are not clear. Further studies on the subtle relationship between the local host factors and the virulence of the organisms grown from these lesions may offer an explanation. In light of these cases and previous reports of even lepromatous leprosy presenting as a single skin lesion, field workers-including both medical and paramedical workers-should carefully perform and interpret slit-skin smears from clinically diagnosed paucibacillary cases so that such unusual presentations of the disease are treated appropriately and not missed.

REDDY, P.K. & CHERIAN, A. Relapse in leprosy after multidrug therapy and its differential diagnosis with reversal reaction. *Ind. J.Lepr., 63(1),* p. 61-69, 1991.

Relapse may be caused either by persisters or through reinfection in a patient released from treatment after MDT. Differentiating relapse from reversal reaction is not always easy, on histological and clinical grounds. A therapeutic trial with steriods for 2-4 weeks can be used to differentiate relapse from reversal reaction occuring in the skins. However, if a patient develops nerve function deficit after release from treatment, it is best to initiate antileprosy treatment along with a long course of steroids.

REVANKAR, C.R. et. al. Reduction in caseload after multidrug therapy in an urban leprosy control programme-a retrospective study in Bombay. *Leprosy Review, 62(1),* p. 44-48, 1991.

A fall in the active registered case prevalence rate together with a fall in the active caseload per worker after the introduction of multidrug therapy (MDT) is becoming a managerial issue in leprosy control. A retrospective analysis was undertaken to assess the caseload per paramedical worker with reference to active cases for treatment (3341), cases for surveillance (2227) and cases for care after cure (165) at the end of December 1989. All these cases were under the care of 24 paramedical workers.

The analysis showed that the caseload per worker was 239 (active cases 139, plus surveillance cases 93, plus care after cure cases 7), through active registered case prevalence rate declined from 1.82/1000 (before starting MDT) to 0.79/1000 by the end of December 1989. The case detection rate was 0.49/1000 by the end of 1989. so, although the active registered case prevalence rate declines, the worker will have enough to do because of the need for surveillance and the detection of relapses, early neuritis, early disabilities and care after cure. Simultaneously, new case detection and treatment must be continued.

All these aspects need to be considered when programme managers are reviewing leprosy control strategy.

TANAKA, M. et. al. Effects of Cyciosporin A on Bacterial Growth and Immunological Responsiveness in BALB/c Mice Infected with *Mycobacterium Leprae. Int. J.Lepr.* 59(4), p. 598-604, 1991.

When BALB/c mice were infected with *Mycobacterium leprae* and orally treated 6 times weekly with a dose of 8 mg/kg cyciosporin A (CsA) for 19 months, the number of organisms was slightly higher at 19 months as compared with mice in which the dose of CsA was gradually decreased after 6 months and discontinued at the 8th month ($p<0.01$ for the 15th and 19th months). Lymphocyte blast transformation (LBT) showed that spleen cells from CsA-treated mice 4 weeks after infection with *M. leprae* and 3 weeks after CsA treatment was stopped responded to the sonicated supernatant of M. *leprae* suspension (SS), *M. leprae* (MI), and concanavalin A (ConA) less than those cells from mice not treated with CsA. This response was dose-dependent. At week 15, 14 weeks after CsA administration was stopped, the LBT response to SS and MI by cells from M. leprae-infected mice exceeded that of mice without CsA treatment, and the response to ConA in *M.* leprae-infected mice was less than that in un-infected mice without CsA-treatment. Thus, if CsA was administered, the T-cell functions were suppressed. However, when CsAtreatment was discontinued for longer periods, the T-cell function was activated. From these results, we speculate that *M. leprae* would have the capability of growing more abundantly in mice treated with CsA 100 mg/kg for 1 week every month.

VACHULA, M. et. al. Effect of Glucocorticoids and Interferon-y on the Oxidative Responses of Monocytes from Leprosy Patients and Normal Donors. *Int.J.Lepr., 59(1),* p. 41-48, 1991.

Leprosy patients suffering from erythema nodosum leprosum are frequently treated with glucocorticosteroids. The role glucocorticosteroids and interferon-gamma (IFN-y) play in regulating the interaction of phagocytic cells with *Mycobacterium leprae* was examined. Monocytes from leprosy patients receiving prednisone therapy responded to lower concentrations of IFN-y *in vitro* with enhanced superoxide anion release when challenged with *M. leprae* or *M. bovis* BCG than did monocytes from healthy subjects and other leprosy patients. Although the number of patients was small and the population heterogeneous, the data suggested that prednisone could after IFN-y efficacy and led to the examination of the effect of glucocorticosteroids on IFN-y activation of monocytes. I FN-y treatment following in vitro dexamethasone pretreatment of mono-cytes from healthy subjects resulted in a greater enhancement of superoxide anion generation than that observed with IFN-y treatment alone. These findings are important considerations in evaluating patient immune function because IFN-y is being used in a number of clinical trials with leprosy patients.

VAN TRIER, Y.D.M. & SOLDENHOFF, R. de. Self-administered dapsone compliance of leprosy patients in Eastern Nepal. *Leprosy Review, 62(1),* p. 53-57, 1991.

Self-administered dapsone intake by leprosy patients in Eastern Nepal was monitored with a urine spot test. Of 341 outpatients 55 (16.1%) were found to be noncompliant. A significant relationship was found between noncompliance and age and between noncompliance and caste. Sex, disease classification, type of treatment, duration of treatment, history of leprosy reactions and travel time to the clinic did not influence the compliance.

In remote areas the urine spot test can be useful in leprosy control programmes.

YODER, L.J. et. al. The activity of rifabutin against *Mycobacterium leprae. Leprosy Review, 62(3),* p. 280-287, 1991.

Minimal effective doses of rifampicin were determined in *Mycobacterium leprae* isolated from skin biopsies of newly diagnosed, previously untreated lepromatous leprosy patients. Rifabutin was more potent than rifampicin. Our previous

report that rifabutin was fully active against rifampicin-resistant *M. leprae* could not be confirmed. Examination of two strains of rifampicin-resistant *M. leprae* from elsewhere, and a repeat experiment on our original strain of rifampicin-resistant bacilli, showed full cross-resistance between rifampicin and rifabutin. A clinical trial in three newly diagnosed, previously untreated lepromatous patients showed that rifabutin has rapid bactericidal activity.

ZAHEER, S.A. et. al. Immunological upgrading with combined immunotherapy and chemotherapy in a lepromatous leprosy patient: a case report. *Leprosy Review, 62(3),* p. 297-302, 1991.

Immunotherapy with *Mycobacterium* w was given, in addition to standard multidrug therapy (MDT) to a lepromatous leprosy (LL) patient with a bacteriological index (BI) of 6. After 15 months of treatment this patient attained bacteriological negativity and clinical inactivity. Histopathpathologically the patient upgraded to borderline-tuberculoid at 12 months, and at 15 months showed features of nonspecific infiltration in the dermis. The rapid immunological upgrading seen in the patient is highlighted in this paper.

BECX-BLEUMINK, M. Duration of Multdrug Therapy in Paucibacillary Leprosy Patients; Experience in the Leprosy Control Programm of the All Africa Leprosy and Rehabilitation Training Center (ALERT) in Ethiopia. *Int.J.Lepr., 60(3),* p. 436-444, 1992.

Multidrug therapy (MDT), according to the recommendations of a WHO Study Group of 1982, was introduced in the leprosy control program of the All Africa Leprosy and Rehabilitation Training Center (ALERT), Ethiopia, in January 1983. Of 6042 paucibacillary patients who were put on MDT during a period of 7 years, 5485 patients (90.8%) completed the course of MDT; 437 patients (7.2%) did not fulfill the requirement for clinic attendance and either discontinued MDT themselves or the treatment was discontinued by the service. The remaining 120 patients (2.0%) either died, were transferred, left the control area or continued MDT after 9 months. The urine spot for the presence of dapsone showed a significantly higher proportion of positive results for patients on MDT than for patients on dapsone.

The analysis of the compliance with the prescribed doses of MDT showed that of 963 patients, 81,9% received six doses of MDT and 18.1%, more than six doses; 82.6% of these 963 patients attended with 100% regularity, 12.7%, 3.6%, and 1.1% missed one, two, or three clinic appointments, respectively, while fulfilling the requirement for overall clinic attendance. Of the 429 patients who had not been treated with dapsone before MDT, the skin lesions were clinically active at the time of stopping MDT in 130 patients (30.3%). In all, except one of the 114 patients (0.9%) who attended for follow-up examination, the skin lesions had become clinically inactive within 2 years after stopping MDT. The recommended duration of MDT is discussed based on findings in the ALERT leprosy control programs and observations by others.

BECX-BLEUMINK & BERHE, D. Occurrence of Reactions, Their Diagnosis and Management in Leprosy Patients Treated with Multidrug Therapy; Experience in the Leprosy Control Program of the All Africa Leprosy and Rehabilitation Training Center (ALERT) in Ethiopia. *Int.J.Lepr., 60(2),* p. 173-184, 1992.

This paper reports on reactions in leprosy patients who were treated with multidrug therapy (MDT) in the leprosy control program of the All Africa Leprosy and Rehabilitation Training Center (ALERT) in Ethiopia. Only those reactions which occurred in patients who had not been treated with dapsone before MDT and which required treatment with prednisolone were included. Until the end of the second year of MDT a reversal reaction had been diagnosed in 43.6% of 266 borderline lepromatous (BL) patients and in 19.2% of 109 lepromatous leprosy (LL) patients, and an erythemanodosum leprosum (ENL) reation

in 2.7% and 11.1% of the patients, respectively. The reversal reactions were observed in 4.9% of the BL patients and in 0% of the LL patients at the time of diagnosis of leprosy, in 26,3% and 12.8% of the patients during the first year of MDT, and in 12.4% and 6.4% during the second year of MDT. ENL reactions were seen in 0.8% of BL patients at diagnosis, 1.1% in the first year and 0.8% in the second year and 2.8% at diagnosis, 5.5% in the first year, and 2.8% in the second year for LL patients.

During a 3 1/2-year period, a total of 405 reactions were diagnosed among multibacillary (MB) patients on MDT; 365 of these reactions (90.1%) were reversal reactions and only 40 (9.9%) were ENL reactions. The point in time of the reversal reactions showed that the risk of several reactions is highest during the first year of MDT. Thereafter there is a gradual decline, althrough reactions were still observed during the fifth year of MDT.

A reversal reaction was diagnosed in 21.0% of 438 BT patients; in 3.4% of the patients the reaction was present at the time of diagnosis of leprosy; in 10.3% it occurred during MDT, and in 7.3% during the first year after release from MDT. During a period of 3 1/2 years a total of 183 reversal reactions were diagnosed among BT patients. The point in time showed a declining trend in the risk of reversal reaction after starting MDT. The risk is highest during MDT, followed by the first 6 months after stopping MDT. However, reactions, although few, still occurred during the fourth year after stopping MDT.

The analysis of the results of prednisolone treatment in 161 patients who were treated for nerve function loss in the field showed that 142 patients (88.2%) regained complete or partial recovery of the nerve function(s), while no improvement was observed in 19 patients (11.8%). With the criteria defined for field treatment of reactions, about 85% of the patients could be treated with standard courses of prednisolone in the field. The main reasons for referral to the hospital were severe ENL reactions, associated medical problems whether or not related to leprosy, examination for a possible relapse, recurrent reactions, and deterioration of nerve function. It was estimated that during the period in which all patients who needed prednisolone were required to be hospitalized, less than one third of the patients who developed a reaction were treated for it.

In addition to the finding that substancially more patients will be treated for their reactions if prednisolone is given in the field, other advantages of field treatment over hospital treatment are: a) it is much more convenient and economical for the patients, b) it has a positive effect on the credibility of the leprosy control services, c) it motivates the staff to do regular sensory and voluntary test and d) it is substantialy less expensive.

BECX-BLEUMINK, M. Relapses Among Leprosy Patients Treated with Multidrug Therapy: Experience in the Leprosy Control Program of the All Africa Leprosy and Rehabilitation Training Center (ALERT) in Ethiopia; Practical Difficulties with Diagnosing Relapses; Operational Procedures and Criteria for Diagnosing Relapses. *Int.J.Lepr., 60(3),* p. 421-435. 1992.

Multidrug therapy (MDT), according to the recommendations of a WHO Study Group of 1982, was introduced in the leprosy control program of the All Africa Leprosy and Rehabilitation Training Center (ALERT), Ethiopia, in January 1983. Paucibacillary (PB) patients are treated with 6 months of MDT. Multibacillary (MB) patients are treated with at least 2 years of MDT and until skin-smear negativity. An analysis was made of the relapses which had been diagnosed among self-reporting patients in four rural districts and Addis Ababa. Among 3065 PB patients, 34 relapses (1.1%) *were* diagnosed during an average period of 6.1 years after stopping MDT (range 2 1/2 to 7 1/2 years). Among 2379 MB patients, 24 relapses (1.0%) were diagnosed during an average period of 4.7 years after stopping MDT (range 2 1/2 to 6 years). The estimated relapse rate per 1000 patient-years after release from MDT was 2.1 for PB patients and 2.4 for MB patients

From the analysis of the clinical, bacteriological, and histopatological findings, it was concluded that there was strong positive evidence for

the diagnosis for 16 of the 34 relapses in the PB patients and for 0 of the 24 relapses in the MB patients. The main cause for overdiagnosis of MB relapses was that to much reliance had been put on skin-smear results, without a careful) comparison of the results with those from before, during, and at completion of MDT; the diagnosis was based on the finding of positive smears in one set of smears only; insufficient attention was given to finding solid-staining bacilli; and findings in biopsies, if these were examined, did not confirm the diagnosis. The main cause of overdiagnosis o PB relapses was that too much reliance was put on histological findings, while these are often inconclusive for differentiating between a relapse and late reversal reaction.

Recommendations are made on how to limit overdiagnosis of relapses. Operational procedures and criteria for making the diagnosis under conditions where facilities for back-up histological and mouse foot pad investigations are not available are proposed.

BECX-BLEUMINK, M. Relapses in Leprosy patients After Release from Dapsone Monotherapy; Experience in the Leprosy Control Program of the All Africa Leprosy and Rehabilitation Training Center (ALERT) in Ethiopia. *Int.J.Lepr., 60(2),* p. 161-172, 1992.

Before implementation of muitidrug therapy (MDT), leprosy patients who were clinically inactive, skin-smear negative and had been treated with dapsone monotherapy for at least 5 years (paucibacillary patients) or for al least 10 years (multibacillary patients) were released from treatment.

An analysis was made of self-reporting relapses in 1081 paucibacillary (PB) patients and 1123 multibacillary (MB) patients who had been released in Addis Ababa and two rural districts of the leprosy control program of the All Africa Leprosy and Rehabilitation Training Center (ALERT). During average period of 6.6 years after stopping dapsone, 44 relapses were diagnosed among the PB patients and 148 relapses among the MB patients. The overall relapse rate was 4.1% or 7.2 per 1000 patient-years after release from treatment for PB patients and 13.2% and 24.8, respectively, for MB patients. The annual relapse rate in PB patients did not differ significantly from year to year. However the relapse rate for MB patients was significantly lower during the fifth to seventh years after stopping treatment compared with the first 4 years. Based on clinical findings there was a strong suspicion of relapse with dapsone-resistant bacilli in 40.4% of MB relapses. It is concluded that the relapse rate for PB patients is acceptable. However, the relapse rate for MB patients is considered too high. It is strongly recommended to administer to all MB patients, including those who have been on long-term treatment with dapsone and have become clinically and bacteriologically inactive, a 2-year course of MDT.

BHATKI, W.S. & CHULAWALA, R.G. Immunotherapeutic potential of ICRC vaccine: a case control study. *Lepr.Rev., 63(4),* p. 358-364, 1992.

A bacteriological follow-up of 16 leproatous patients with a high initial Bacteriological Index (BI) showed that In 8 randomly selected patients who received single doses of ICRC Vaccine (C44) at the onset of multidrug therapy, the average reduction of BI was from 4.4+ to 1+ in 2 years - 3 of these patients became negative and 3 showed BI 1+ or less. Comparable bacteriological assessments in 8 non-vaccinated but otherwise similar patients showed an average reduction of BI from 4.7+ to 2.6+ I.e., consistent with the expected response to MDT in lepromatous patients. Here we discuss the role of immunotherapy and the selection of a desirable antileprosy vaccine in the context of fixed-duration MDT.

CARTEL, J.L. et. al. Leprosy in French Polynesia. The possible Impact of muitidrug therapy on epidemiological trends. *Leprosy Review, 63(3),* p. 223-230, 1992.

In 1982, following the recommendations of a WHO study group, multidrug therapy (MDT)

was introduced into French Polynesia to treat all patients suffering from active leprosy, and - only on request - those still on dapsone monotherapy. After 5 years, a clear-cut decrease of prevalence and mean annual detection rates for leprosy (except for detection rates among children aged less than 15 years, many of such cases being detected early by increased household contact training) has been observed. There was also a decrease in the proportion of newly detected cases with disabilities. during the 21-year period preceding the introduction of MDT into the control programme, mean annual detection rates for leprosy had remained stable, and this led to the consideration that such a decrease was due neither to the natural decline of the disease nor to the economic improvement of the country. Our results, together with the fact that, to date, the relapse rate was nil in the Polynesian patients put on MDT, strongly suggest that the implementation of MDT has resulted in a decrease of detection rates for leprosy which may be a consequence of a decrease in the transmission of the disease.

CHIN-A-LIEN, R.A.M. et. al. Follow up of multibacillary leprosy patients using a phenolic glycolipid-1-based ELISA. Do Increasing ELISA-values after discontinuation of treatment indicate relapse? *Lepr. Rev., 63(1),* p. 21-27, 1992.

With the introduction of reproducible serological tests it was hoped that relapses in leprosy patients, after discontinuing treatment, could be detected before damaging reactions occurred and before the patients became infections. The possible value of an ELISA using a semisynthetic analogue of phenolic glycolipitl-I to detect antibodies to this antigen in order to predict a relapse in multibacillary patients was investigated. In contrast to that reported for paucibacillary patients, this test was useful to detect early relapses in multibacillary patients. In 3 out of 4 multibacillary patients who relapsed, the ELISA-values were increased. The decreased ELISA-values in the one relapsed patient could be attributed to the corticosteroid therapy. In the multibacillary patients who did not relapse after RFT, the ELISA-values were consistently low or decreased. In only one patient did the ELISA-values increase following his release from treatment an this patient was clinically suspected of developing a relapse.

FRANKEL, R.I. et. al. Resolution of Type 1 Reaction in Multibacillary Hansen's Disease as a Result of Treatment with Cyciosporine. *Int.J.Lepr., 60(1),* p. 8-12, 1992.

Type 1 Hansen's disease reaction (reversal reaction) is believed to result from a change In the immune response in patients with borderline Hansen's disease. The only effective therapy for significant type 1 reactions has been systemic corticosteroid therapy. Cyciosporine is an immunosuppressive drug which has been widely used in organ transplantation. We report a case of type 1 reaction complicating borderline lepromatous Hansen's disease. Cyciosporine therapy resulted In prompt and sustained resolution of the reaction. The possible mechanism of action of cyciosporine and the implications regarding the immunopathogenesis of type 1 reaction are discussed.

FRANZBLAU, S.G. et. al. Doubleblind evaluation of BACTEC and Buddemeyer-type radiorespirometric assays for in vitro screening of antileprosy agents. *Leprosy Review, 63(2),* 1992, p. 125-133.

Two radiorespirometric assays, the BACTEC 460 and Buddemeyer-type $14CO_2$ detection systems, were evaluated in a double-blind manner for their ability to discriminate between authentic antileprosy agents and inactive compounds. Freshly harvested, nude-mouse derived *Mycobacterium Ieprae* were incubated in axenic media in the presence of coded test solutions prepared in a remote laboratory. Activity was assessed by comparing the rate of $14CO_2$ evolution from [1-^{14} C] palmitic acid to controls. Breaking the code revealed that both systems demonstrated a dose response to ethionamide, pefloxacin and

rifampicin as well as sensivity to dapsone. Most of the water, ethanol, sucrose, dabsyl chloride and riboflavin negative-control samples failed to effect a significant reduction In radiorespirometric activity. This study confirms the ability of the radiorespirometric assays to function as a primary drug screening system in leprosy.

GIDOH, M. & TSUTSUMI, S. Activity of sparfloxacin against *Mycobacterium leprae* inoculated into footpads of nude mice. *Leprosy Review, 63(2),* p. 108-116, 1992.

The antileprosy activity of a new quinolone, sparfioxacin, was examined in the nude mouse footpad model. By serial dosing (once a day, 5 or 6 times per week, during the 3rd-5th months postinoculation), 10 mg/kg of sparfioxacin displayed bactericidal-type activity and bacteriostatic activity was present at daily doses of 5 and 2 mg/kg. By intermittent dosing (once a day, twice weekly at daily doses of 10 and 20 mg/kg or once weekly at a daily dose of 30 mg/kg, during the 3rd-5th months postinoculation), sparfloxacin markedly Inhibited the growth of leprosy bacilli with slight remultiplication at later stages. Sparfloxacin seems to be worth studying clinically as a novel antileprosy drug.

GIDOH, M. et. ai. Bactericidal action at low doses of a new rifamycin derivative, 3-hydroxy-5-(4-isobutyl-l-piperazinyl) benzoxazinorifamycin (KRM-1648) on *Mycobacterium leprae* Inoculated into-footpads of nude mice. *Lepr. Rev., 63(4),* p. 319-328, 1992.

Among series of newly-synthesized benzoxazinorifamycins, 2 of the 3'-hydroxy-5'-(4-alkyl-l-piperazinyl) derivatives, named KRM-1648 and KRM-2312, whose respective alkyl residues are isobutyl and isopropyl, were examined for efficacy against nude mouse-model leprosy. KRM-1648 completetely inhibited the growth of leprosy bacilli inoculated into nude mouse footpads, even 6 months after the medication had been stopped, when given orally at a daily dose of 0.6 mg/kg, 5 or 6 times weekly, during 3-5 months postinoculation. In comparison, the growth inhibition by KRM-2312 was Incomplete under the same conditions, though it was still stronger than that by rifampicin. Complete growth inhibition by KRM-1648 was also observed when it was given orally at a dose of 1 or 3 mg/kg twice weekly during the same period. In contrast, the growth inhibition by rifampicin was only slight at 1 mg/kg and partial at 3 mg/kg under the same condition.

GIRDHAR, A. et. aI. Red discoloration of the sputum by ciofamizine simulating haemoptysis - A case report. *Lepr. Rev., 63(1),* p. 47-50, 1992.

A patient of lepromatous leprosy, who received a high dose of clofazimine as part of multidrug therapy, for chronic erythema nodosum leprosum (ENL) had frequent' haemoptysis'. The haemoptysis was later found to be due to expectoration of ciofazimine. This Interesting, and perhaps first cases of such an occurrence, is reported.

GUPTA, A. et. al. Intravascular Hemolysis and Acute Renal Failure Following Intermittent R fampin Therapy. *Int.J.Lepr., 60(2),* p.185-188, 1992.

Renal failure is a rare complication associated with the use of rifampin. Intravascular hemolysis leading to acute renal failure following rifampin therapy is extremely rare. Two patients with leprosy who developed hemolysis and acute renal failure following rifampin are reported.

JADHAV, V.H. et. al. Comparison of two multidrug regimens in multibacillary leprosy. *Ind.J.Lepr., 64(4),* p. 501-504, 1992.

One of the technical problems relating to the multidrug therapy of leprosy is the slow decrease in the bacteriological index (BI) In multibacillary patients. In this study we have compared a regimen containing rifampicin given dailyfor 9 months with the standar WHO multidrug regimen for

multibacillary leprosy. We have found, at the end of two years, a significantly greater fall of BI in patients who had received the regimen containing daily rifampicin as compared to those who had received pulsed doses of rifampicin. The doses of dapsone and clofazimine were similar in these two groups. It appears that daily administration of rifampicin may be useful in treating multibacillary patients in whom reduction in the BI is slower than expected. However, in view of its high cost and the very much increased incidence of type-2 reactions and hepatitis, daily rifampicin therapy cannot be recommended for a control programme.

KAR, P.K. et. al. Indeterminate leprosy: A therapeutic evaluation. *Ind.J.Lepr., 64(2),* p.163-168, 1992.

Out of 50 cases of indeterminate leprosy, 46 were male and 4 were female. The only clinical finding was a single hypopigmented macule in 38 (76%) cases. Nine (18%) patients had two and three (6%) cases had three hypopigmented macules. All patients were treated with multidrug therapy for one year. At the end of six months, the lesions were still active in 12 (24%) cases. At the end of one year of treatment it was found that 33 (66%) patients became inactive and 3 (6%) cases were still to be active. The study shows that all indeterminate leprosy cases must be treated with multidrug therapy till all signs of activity are subsided.

KATOCH, K. et. al. Treatment of paucibacillary leprosy with a regimen containing rifampicin, dapsone and prothionamide. *Ind.J.Lepr., 64(3),* p. 303-312, 1992.

Ninety paucibacillary leprosy patients having indeterminate (I) tuberculoid (TT) and borderline tuberculoid (BT) type of leprosy with bacterial index (BI) of less than two on the Ridley scale were treated with rifampicin (RFM) 600 mg once a month, dapsone (DDS) 100 mg daily and prothionamide (PTH) 250 mg daily. Treatment was stopped at the end of six months. The patients tolerated the drugs fairly well and in only two patients the drugs had be stopped (in one due to Jaundice and in the other due to gastric intolerance). About 6% of patients had early reactions which subsided with additional steroid therapy. The inactivity rate was 60% at six months and this improved to 96% at 12 months. No cases of late reactions and relapses were encountered In the limited follow-up period of six months; and a longer follow-up is necessary for ascertaining the relapse rates. The preliminary results however suggest that the addition of prothiominamide to the standard WHO paucibacillary regimen is well-tolerated with increased inactivity rate and fewer instances of late reactions.

KAUR, S. et. al. Paucibacillary multidrug therapy in leprosy 7½ years experience. *Ind.J.Lepr., 64(2),* p. 153-162, 1992.

Three hundred and twenty-three paucibacillary (PB) leprosy patients were treated with WHO, recommended multidrug therapy (MDT) and followed up for over 7 1/2 years. The paucibacillary MDT regimen (PBR) was well ascepted and tolerated. Complete clinical regression was attained in 61.2% patients after 6 doses of PBR. Persistence of clinical activity after 6 months of therapy was associated with occurrence of type I upgrading reaction, presence of six or more patches and more than two thickened major nerve trunks. Reversal reactions were encountered in 15.9% patients, one third of which were accompanied by severe neuritis. Delayed upgrading reaction occured in six patients, two patients had relapse one and two years after stopping of PBR.

The WHO recommended MDT regimen for paucibacillary cases needs careful evaluation and it may be necessary to extend the treatment beyond six months in certain situations.

MUKHERJEE, A. et. al. Histopathological Monitoring of an Immunotherapeutic Trial with *Mycobacterium w. Int J.Lepr., 60(1),* p. 28-35, 1992.

Immunotherapeutic trials with *Mycobacterium w (M.* w.) on multibacillary patients are in progress at two large hospitals in New Delhi. A total of 380 patients so far have been inducted into the trial. The histopathological profile of the initial 87 patients had MDT with starch injections as a placebo. Skin biopsies were taken at induction and thereafter at every 6 months. The results show a significantly higher proportion of biopsies with histopathological upgrading and/or clearance of dermal granuloma among the vaccinated cases. The number of patients becoming bacteriologically negative was higher in the vaccine group. There was no increase in the degree of neural inflammation in the biopsies showing upgrading. The lepromin site biopsy In patients who converted to positivity after vaccination showed epithelioid cell granulomas as did the biopsies from the nodules developing at the vaccination sites. The histopathological observations confirm the additional immunotherapeutic effect of *M.* w. used along with standard MDT therapy.

PATIL, M.A. et. al. Correlation between inhibitory effect of quinolones and mycolic acid metabolism in mycobacteria. *Ind.J.Lepr., 64(3),* p. 331-340, 1992.

Mycolic acids are important components having a significant role in maintaining the rigidity of mycobacterial cell wall. They could also be the barrier for penetration of certain drugs into the bacterial cell. A novel in vitro model system was established for assessing the effect of Ciproflaxacin on mycolic acid metabolism in pathogenic mycobacteria *M. Kansasii* (which has similar mycolic acid pattern to that from *M. leprae)* and the effect of norfloxacin in *M. intracellulare.* These test mycobacteria were exposed in their midlogarithmic phase of growth to 0.5, 1, 2, 3, 4, 5 and 6ug ml of ciprofloxacin and norfloxacin respectively for 1, 2 and 24 hours. Ciprofloxacin completely inhibited the synthesis of mycolated in *M. kansasiiat*3, 4and 5 ug/ml; whereas norfloxacin exhibited its maximum inhibitory action on mycolic acids in *M. intracellulare* at 6 ug/ml for all the durations of exposure. Inhibition of mycolates directly correlated with bacterial viability which was estimated by colony forming units. The effect of quinolones on mycolic acid metabolism appears to be direct and not secondary to DNA gyrase. The results obtained from this study and our previous findings show that mycolic acid metabolism is affected by various group of drugs, whose primary sites of activity may be different. The findings of the present study may have significant therapeutic implications in leprosy and other mycobacterial diseases.

PATTYN, S.R. et. al. Ambulatory treatment of Multibacillary leprosy with a regimen of 8 months duration. *Lepr.Rev., 63(1),* p. 36-40, 1992.

An ambulatory treatment regimen for multibacillary leprosy, of 34 weeks duration composed of 8 weeks daily supervised rifampicin, ethionamide (ETH), dapsone (DDS) and clofazimine (CLO) followed by 26 weeks of unsupervised ETH, DDS end CLO, introduced in 1983 has been evaluated; 268 patients were followed for a mean of 4.4 years and a total of 1188 patient years. The relapse rate was 0.33 per 100 patient years of follow up. The reduction of the duration of the combined administration of RMP + ETH reduced the hepatotoxicity to 1.4%. It is possible that both phases of the regimen studied could still be reduced, however in the near future ETH will be replaced by alternative bactericidal drugs, avoiding the hepatotoxicity.

PATTYN, S. R. et. al. Treatment of multibcillary leprosy with a regimen of 13 weeks duration. *Lepr.Rev. 63(1),* p. 41-46, 1992.

In a prospective study 559 multibacillary patients in Zaire were treated for 13 weeks with twice weekly rifampicin (600 mg) and daily ethionamide (500 mg) and dapsone (100 mg),13-RED, or ciofazimine (100 mg), 13-REC. The patients were followed for a total of 1418 person

years, mean 3.2 years. The incidence of hepatitis was 3.3%. The incidence of relapses was 0.28 per 100 person years. Relapses were due to drug-sensitive organisms.

In patients who received the same drug regimens but with a reduced dosage of ethionamide to 5 mg/k bodyweight, the Incidence of hepatitis was significantly lower but the relapse rate was 7.8 per 100 person years of follow-up in the RED group, no relapses were diagnosed in the REC group.

It is concluded that by the use of potent antileprosy drugs in suitable combinations and dosages it will be possible to shorten the duration of antibacterial treatment in multibacillary leprosy to 3 months.

RAMESH, V. et. al. Multidrug Therapy in Multibacillary Leprosy; Experience in an Urban Leprosy Center. *Int.J.Lepr., 60(1),* p. 13-17, 1992.

The article records the experience of treating multibacillary (BB, BL, and LL) leprosy with multidrug therapy (MDT) in an urban leprosy center. The problem of leprosy is to be properly assessed throughout the Indian subcontinent because most of the epidemiological data from the areas labeled low-endemic have to be updated. The regularity of therapy must be ensured and monitored constantly but in spite of our efforts to do so some factors were beyond our control!, such as providing a means of livelihood for the migrants from other places. In addition, the intake of drugs also has to be periodically checked from the history and discoloration of skin and, most importantly, confirmed by performing random spot tests for dapsone in the urine. The main problems discussed are the difficulty in demonstrating acid-fast bacilli in slit-skin smears from the macular form of borderline leprosy (also called dimorphous macular) and, secondly, whether the duration of multibacillary therapy was adequate since only approximately 50% of our patients achieved smear negativity after taking MDT for the stipulated period of 24 months. Experiences from other centers have suggested that the duration of MDT should be prolonged in multibacillary patients to achieve smear-negative status. Yet another group notes that smear negativity is gradually achieved during the period of surveillance following stoppage of MDT after 24 months. These questions await more information from good centers with controlled field studies.

RAO, P.S. et. al. Initial intensive therapy for multibacillary leprosy patients - in retrospect. Lepr.Rev., 63(4), p. 350-357, 1992.

We analysed the results of 4845 multibacillary (MB) patients being treated with multidrug treatment (MDT) in the Srikakulam District of Andhra Pradesh, India. Of these, 2309 (47.7%) patients were given an initial 14-day intensive therapy with rifampicin, ciofazimine and dapsone, followed by the recommended pulse therapy. The rest of the cases were given only pulse therapy. The improvement in terms of bacteriological clearance and the proportion of cases declared released from treatment (R FT) was found to be significantly higher among patients treated with only pulse therapy. Clinic attendance was found to be better and more regular in patients treated with intensive therapy, and no relapses were seen with either therapy. The implications of these findings on the operational aspects of programme implementation were discussed.

SHANNON, E.J. et. al. Thalidomide's effectiveness in erythema nodosum leprosum is associated with a decrease in CDH-cells in the peripheral blood. *Lepr.Rev., 63(1),* p. 5-11, 1992.

Thalidomide is well documented as being an effective drug in the treatment of erythema nodosum leprosum (ENL). The mechanism of action of thalidomide in ENL, as well as the pathogenesis of ENL are yet to be fully determined.

Lepromatous leprosy patients experiencing ENL have been reported to have an increase in the ratio of CD4+ to CD8+ cells in their blood and ENL skin lesions. Thalidomide has been shown to cause a decrease in the ratio of CD4+ to CD8+ lymphocytes in the blood of healthy males. This

decrease was due to a significant reduction in the numbers of CD4+ lymphocytes and an apparent increase in the numbers of CD8+ lymphocytes.

In this study, thalidomine's effectiveness in halting chronic ENL and arresting a relapse into ENL, was consistently associated with a decrease in the numbers of CD4+ lymphocytes in the blood of 2 male lepromatous leprosy patients.

SHETTY, V.P. et. al. Persistence of Mycobacterium leprae in the peripheral nerve as compared to the skin of multidrug-treated leprosy patients. *Lepr.Rev., 63(4),* p. 329-336, 1992.

Skin and nerve biopsies obtained from 18 multibacillary (MB) and 16 paucibacillary (PB) cases of leprosy who had been fully treated by the WHO regimen were assessed for bacterial load using different staining techniques. In addition skin and nerve homogenates of 10 MB cases were tested for 'persistor' *Mycobacterium leprae* using immuno suppressed mice.

While significant amounts of integral bacilli and BCG cross-reactive antigen of *M. leprae* were detected both in skin and nerve tissued of all the MB cases (100%), 56% of skin and 62% of nerve biopsies of PB cases also showed the presence of BCG cross-reactive antigen.

Detection of 'persistor' M. *leprae* in 2/10 skin biopsies (20%) and 3/10 nerve biopsies (30%) of MB cases was thought to be unexpectedly high after 2 years of MDT.

VAN BRAKEL, W.H. et. al. The allocation of leprosy patients into paucibacillary and multibacillary groups for multidrug therapy, taking into account the number of body areas affected by skin, or skin and nere lesions. *Lepr.Rev., 63(3),* p.231-246,1992.

In Nepal, the setting up and maintaining of reliable services for slit-skin smears has proven difficult. A clinical classification system for leprosy has therefore been developed to assist in the allocation of patients to either paucibacillary or multibacillary groups for the purposes of multiple drug therapy (MDT), using 9 body areas: head (1), arms (2), legs (2), trunk (4). Patients with more than two areas of the body affected are grouped as multibacillary (MB) and those with only one or two areas affected are paucibacillary (PB). Using a computer simulation model and the data of 53 patients registered at Green Pastures Hospital (GPH) in Pokhara and 703 field patients from the Western Region, different clinical classification systems were evaluated with regard to their sensivity, specificity, and predictive value for MB or PB classification, as compared with the histological classification for the GPH cases and the bacteriological classification for the field patients. The sensivity and specificity of the body area system in present use were 93% and 39%, respectively. The low specificity is due to MB overclassification. The sensivity of the WHO classification system without skin smear facilities is 73% (the difference with the body area system is significant: $p < 0.05$, McNemar's test). Our histology findigns confirm previous publications indicating that, while some borderline tuberculoid (BT) patients may outwardly have a 'PB appearance' and be skin-negative, their nerve biopsy and sometimes skin biopsy may show a 'MB' picture. This is the first publication discussing a 'body area system' for the purpose described, including diagrams of the areas used. In Nepal it has proved easy to use and teach and its use may be justified in other control programmes which implement MDT, particularly if slit-skin smear services are unreliable or nonexistant.

VENKATESWARLU, B. et. al. Role of Rifampin and Clofazimine Ointments in the Treatment of Leprosy. *Int.J.Lepr., 60(2),* p. 269-270, 1992.

The use of rifampin and ciofazimine ointments alone and in combination over the patches of tuberculoid patients has a beneficial effect. In combination (rifampin and clofazimine), erythema, inflammation, and edema are considerably reduced. For some of the cases with a recent appearance of a patch, the patch completely disappeared. It is suggested that topical therapy with rifampin and ciofazimine ointments would be economical and beneficial in tuberculoid leprosy.