CURRENT LITERATURE

This department carries selected abstracts of articles published in current medical journals dealing with leprosy and other mycobacterial diseases.

General and Historical

Chen, P. C. Y. Bringing leprosy into the open. World Health Forum **9** (1988) 323–326.

A study in Sarawak, Malaysia, revealed diverse opinions, prejudices and degrees of knowledge about leprosy among various ethnic groups. The information gathered was used as the base on which a health education package relating to the disease was established. It is intended that this will lead to the early detection and treatment of a higher proportion of cases than has previously been possible.—Author's Abstract

Fleming, S. The leper's dilemma. Archaeology **36** (1988) 68–69.

Leprosy has many disguises; so many, in fact, that many folk in antiquity suffering from quite different diseases, such as syphilis, psoriasis and diabetes mellitus, were also labeled as lepers.

The distinctive irony of leprosy's history lies in the attitude toward the disease taken up by the church in the Medieval era. Leper hospitals were placed outside town confines, according to the Levitical precept that a leper should dwell "without the camp." Unfortunately, however, Leviticus had been mistranslated in four discrete steps in a way that, if the inherent errors had not eventually caused such human misery, would be linguistically laughable. According to Levitical law, several ceremonially defiling conditions, including a disfiguring skin disorder labeled *tsara'ath* in Hebrew, required separation from both religious and secular communities. This word was translated into Greek as *lepra.*

But Greek physicians already knew leprosy well enough, and called it *elefantiasis* because of the facial deformities caused by excessive globi in the advanced disease. Greek medicine reached western Europe via Arabic translations, but the Arabs already had a disease, *das fil,* equivalent in name to elefantiasis, but actually describing the tropical disease caused by filarial worms, and still known today as elefantiasis because of the gross and wrinkled limb swelling it causes. Therefore a quite different Arabic word, *juzam,* was later translated into Latin as *lepra,* the same word the Greeks had used for a vague collection of different diseases! So through a linguistic maze of confusion, a specific disease of no religious significance was blurred into a diffuse Levitical concept of purity.—(*From* the Article)

Liang, Z. and Ma, X. [On the relation between the ancient poem "Fu Yi" and leprosy.] China Lepr. J. **4** (1988) 94–96. (in Chinese)

In "The Book of Songs" there is a poem "Fu Yi" which describes a group of women working. It is just a folk song. The authors confirm that its main idea had nothing to do with leprosy, and it was the Confucians of the West Han Dynasty who used this folk song to advocate feudal morals which did not allow women to remarry. They concocted a story about a woman who didn't have the heart to forsake her husband suffering from leprosy and wrote the "Fu Yi" to express her kindness. The authors think that such explanation of the "Fu Yi" is a complete misrepresentation and a product of that period. On one hand, it advocates the feudal morals of refusing women remarriage; on the other hand, it reflects the social ideology which discriminated against leprosy in the Han Dynasty. According to the patriarchal law then, people were to divorce themselves from their leprous spouses. From these considerations it can be judged that leprosy was epidemic in the ear-

ly stage of the western Han Dynasty.—Authors' English Abstract

Naik, S. S., Samant, S. G. and Godbole, P. M. Involvement of students in a leprosy health education programme—an experiment. Lepr. Rev. **59** (1988) 255–258.

Student participation at the college and high school levels can be obtained for leprosy health education programs if proper motivation is given. Involving nonleprosy agencies such as the student community will help to overcome the stigma of leprosy in society. The experiment of "Involvement of College Volunteers" and "Mitra" are described and have the potential to spread to other regions.—Authors' Summary

Wallach, D. and Bach, M.-A. [Recent acquisitions on Hansen's disease.] Ann. Dermatol. Venereol. **115** (1988) 73–76. (in French)

L'intérêt suscité par la maladie de Hansen ne fait que croître. Les techniques les plus récentes de l'épidémiologie, de la génétique, de la bactériologie, de la biologie moléculaire, de l'immunologie, sont toutes mises en œuvre pour comprendre et éradiquer un des fléaux les plus spectaculaires de la pathologie humaine. Comme pour toutes les maladies infectieuses, mais c'est ici mieux connu et plus évident, c'est l'immunologie qui s'avère la science de base. Et c'est autour des diverses disciplines de l'immunologie que s'articulent les très nombreuses publications récentes témoignant de l'effort mondial, stimulé et coordonné par l'OMS, pour vaincre la lèpre.—(*From* the Article)

Chemotherapy

Cui, C., *et al.* [Treatment of multibacillary leprosy with MDT for one year.] China Lepr. J. **4** (1988) 76–77. (in Chinese)

One-hundred-four multibacillary cases of leprosy have been treated by the WHO triple drug regimen for one year and showed that the effect of the treatment is very good clinically, bacteriologically, and pathologically, whether for new patients or for relapsed ones. Their mean bacterial index decreased from 2.35 to 1.63. The regimen is also good for type 2 leprosy reaction. The side effects include pigmentation and ichthiosiform change of the skin without damage to the kidneys and liver.—Authors' English Abstract

Ellard, G. A., Pannikar, V. K., Jesudasan, K. and Christian, M. Clofazimine and dapsone compliance in leprosy. Lepr. Rev. **59** (1988) 205–213.

The regularity with which multibacillary patients, who were being treated with the WHO Study Group regimen in a THELEP-sponsored field trial in South India, ingested their prescribed daily clofazimine and dapsone was studied. The ingestion of clofazimine was monitored using a specially prepared formulation containing minute amounts of isoniazid as an innocuous marker. Overall drug acceptability and compliance was excellent. Approximately 75% of the prescribed daily clofazimine and dapsone doses were being ingested, and it was concluded that only 5% of the patients would have benefited if their treatment had been supplemented by acedapsone injections.

There was however a marked correlation between the self-administration of the two drugs with the consequence that the patients at greatest risk of developing rifampin resistance because of poor dapsone compliance were the very ones most unlikely to take their daily clofazimine treatment. The results obtained emphasize the importance of employing regimens containing high degrees of supervised drug administration, especially in areas where drug compliance is known to be poor.—Authors' Summary

Irudaya Raj, P. P., Aschhoff, M., de Wit, M., Balakrishnan, S. and Lilly, L. Certain aspects of dapsone metabolism in leprosy patients as studied by high performance liquid chromatography (HPLC) and qualitative screening tests. Indian J. Lepr. **60** (1988) 215–224.

Dapsone (DDS) in the urines of 250 leprosy patients collected on surprise visits was screened by simple paper spot, tile tests and sensitive enzyme-linked immunosorbent assay (ELISA) and hemagglutination inhibition (HI) tests. The urinary DDS concentration as well as DDS/C ratios were also studied. Simultaneously, 50 μl of blood was collected from each of these patients and its dapsone content was estimated by HPLC. Urine samples with means of 25 to 30 μg/ml DDS and 55–64 μg/mg DDS/C ratios were found to give positive tests by any of the above screening procedures, while their mean blood DDS concentration was found to be 0.91 μg/ml. The corresponding values for those specimens giving negative tests were 3.8 to 5.7 μg DDS per ml and 9 to 13 μg/mg DDS/C ratio. The blood DDS concentration in this group was ranging from 0.16 to 0.18 μg/ml. The findings are discussed in relation to their metabolic significance and their application in a leprosy control program.—Authors' Abstract

Irudaya Raj, P. P., Aschhoff, M., Lilly, L. and Balakrishnan, S. Influence of acetylator phenotype of the leprosy patients on the emergence of dapsone resistant leprosy. Indian J. Lepr. **60** (1988) 400–406.

The half time of disappearance of dapsone (DDS) and monoacetyldapsone (MADDS) and the acetylator phenotype of the leprosy patients who harbored dapsone-sensitive and dapsone-resistant *Mycobacterium leprae* were assessed in 27 subjects. Sixteen patients were rapid acetylators, 5 were slow, and 6 were intermediate acetylators. The mean $T_{1/2}$ of dapsone (30.26 ± 11.0 hr) and monoacetyldapsone (31.33 ± 12.0 hr) were also studied in the above patients. The percentage of different acetylators in both resistant and sensitive groups was similar, showing no correlation between the emergence of drug resistance and the phenotype of the patient. The mean time of disappearance of DDS and MADDS in the different acetylators did not show significant difference. The ratios of MADDS/DDS in an individual at 3, 6, or 24 hr after the dose were similar. The mean $T_{1/2}$ of DDS and MADDS in resistant and sensitive patients also showed no difference. Neither $T_{1/2}$ of DDS or MADDS nor the acetylator phenotype seem to influence the emergence of dapsone resistance.—Authors' Abstract

Kar, P. K., Jha, P. K., Panayach, J. S. and Snehi, P. S. A clinico-pathological study of multidrug regimen in paucibacillary leprosy. Indian J. Lepr. **60** (1988) 235–241.

Preliminary results of a clinical trial in 100 untreated paucibacillary leprosy cases with multidrug therapy (MDT) as per WHO recommendation are presented. Out of 100 fresh cases studied 18 had indeterminate, 35 tuberculoid and 47 cases had borderline tuberculoid leprosy. All were given MDT consisting of rifampin 600 mg once a month and dapsone 100 mg daily for 6 months. At the end of 6 months all the cases were evaluated clinically and histopathological examination of lesions were studied. The lesions were still active in 35% of the patients clinically and 47% histologically. Complete histological resolutions have come across only in 4 cases suffering from indeterminate leprosy. Altogether 65% of cases receiving MDT have shown marked improvement to total inactivation. Histologically, lymphocytic infiltration still persisted in 90% of slides examined and nerve infiltrations were still present in 64% of cases at the end of 6 months' MDT. This study shows that treatment with this multidrug regimen for 6 months may not be sufficient to treat all types of paucibacillary leprosy cases.—Authors' Abstract

Naik, S. S., Bhanage, N. D., Sawant, K. V. and Ganapati, R. A bacteriological assessment of multibacillary cases in leprosy colonies after 4½ years of multidrug therapy. Indian J. Lepr. **60** (1988) 393–399.

In this presentation we have devised a novel way of calculating the total bacterial quantum in 100 (78 LL and 22 BL) mul-

tibacillary leprosy patients living in leprosy colonies. The calculation is based on Ridley's logarithmic scale. We have also attempted to assess the reduction in the bacterial quantum as a result of intervention through multidrug therapy (MDT). Fifty-three percent of the patients were rendered bacteriologically negative within 2 years of treatment of MDT and 94% at the 54th pulse dose, i.e., at the 54th month. The bacterial quantum in human source as leprosy patients was calculated thus—average BI of the group × number of patients in each group × multiplication factor devised as per Ridley's bacterial index (BI). By applying this purely arithmetic formula, it was found that 99.8% of the bacterial load is harbored in leprosy patients having a BI more than 3. The introduction of MDT initiated the reduction in total bacterial quantum "based on above arithmetic scale" and this was achieved very fast, i.e., from 100% to 5% at 12 months and to 0.4% at 24 months. We believe that if one wants to achieve leprosy control through a reduction in total bacterial quantum within a specific period, leprosy cases with a BI of more than 3 should be treated on priority basis.—Authors' Abstract

Naik, S. S. and Sahasrabudhe, R. V. Comparative study of different drug compliance tests available in leprosy. Indian J. Lepr. **60** (1988) 270–276.

In view of the application of dapsone (DDS) detection tests in field conditions blood collection is impracticable. Saliva and sweat of persons who are on regular dapsone consumption possess too little quantity to be detected by the "DDS spot test," "DDS tile test" and "dapsone/creatinine ratio." Hence urine is left as a choice as compared to above biological fluids for the detection of dapsone. "Dapsone/creatinine ratio" and "detection of dapsone by ELISA" require a laboratory set up and hence for the practical use in field conditions simple tests such as the "DDS spot test" and "DDS tile test" can be practiced. As compared to the "DDS spot test," the "DDS tile test" is five times more sensitive and gives reliable results in the detection of DDS in urine at less cost.—Authors' Conclusions

Nigam, P. K., Singh, P. K., Singh, G. and Kumar, M. Rifampicin induced uterine bleeding. Indian J. Lepr. **60** (1988) 303–305.

A case of uterine bleeding after intake of rifampin is reported in a 35-year-old female. Provocation test was also positive. The underlying mechanism, whether it was a hypersensitivity phenomenon like fixed drug eruption or due to induction of uterine acyl-hydrolase enzyme, is not clear. Uterine bleeding has not been observed as a side effect of rifampin in the past.—Authors' Abstract

Pavithran, K. Relapse of paucibacillary leprosy after short course multidrug therapy. Indian J. Lepr. **60** (1988) 225–229.

Among 25 patients who had short-course multidrug therapy as recommended by the WHO for paucibacillary leprosy, 3 were observed to develop relapse of their disease 8 to 12 months after completion of treatment. These three cases of relapse are reported in detail. The duration of chemotherapy recommended by the WHO in paucibacillary cases appears to be too short.—Author's Abstract

Philip, P. A., Gayed, S. L., Rogers, H. J. and Crome, P. Influence of age, sex and body weight on the dapsone acetylation phenotype. Br. J. Clin. Pharmacol. **23** (1987) 709–713.

The acetylation of dapsone (DDS) was determined by estimation of the ratio of monoacetyldapsone (MADDS) to DDS concentrations in plasma following a single dose of DDS in 337 white British subjects (193 female, 144 male). The percentage of slow DDS acetylators in the whole group was 60.3%. There was no statistically significant difference in this proportion between 191 elderly subjects (age > 65 years) and 143 young subjects (age < 30 years). Although there was a small (66.3%) but significant ($p = 0.033$) preponderance of slow acetylators in the young male group, there was no difference in the distribution of acetylator phenotypes between the sexes among either the elderly group or in the whole population studied. No correlation was found

between absolute body weight and MADDS/DDS ratios.—Authors' Abstract

Reddy, P. K. Occurrence of reversal reactions in BT patients during WHO paucibacillary leprosy MDT (1982). Indian J. Lepr. **60** (1988) 453–456.

BT patients were treated with WHO paucibacillary multidrug therapy (MDT) (1982). The patients suffered from reversal reaction neither at the time of initiation of MDT nor prior to that. During the 6-month period of MDT, one patient developed reversal reaction of a skin patch, and another patient developed neuritis of a peripheral nerve trunk.—Author's Abstract

Sahu, A., Saha, K., Kashyap, A. and Chakrabarty, A. K. Interaction of anti-leprosy drugs with the rat serum complement system. Immunopharmacology **15** (1988) 143–150.

Dapsone, clofazimine and rifampin, the three most important constituents of multidrug therapy against leprosy, were studied with respect to their effects on the rat serum complement system, *in vitro* as well as *in vivo*. Of the three drugs only dapsone and clofazimine exhibited significant *in vitro* anti-complement activity and only at a very high, non-therapeutic dose of 0.24 mg/ml. On the contrary, rifampin could not induce significant *in vitro* complement consumption. Furthermore, dapsone and clofazimine could reduce rat-serum-mediated rabbit erythrocyte hemolysis in the presence of Mg^{2+}-EGTA, indicating that they could also affect the alternative pathway of complement activation. However, the latter pathway of complement consumption by these drugs seems to be insignificant because the factor-B-mediated complement-consumption system is minimal in rat sera. Immunoelectrophoretic study of mixtures of fresh rat sera and antileprosy drugs against specific anti-rat-C3 antisera demonstrated that dapsone and clofazimine could not cleave the C3 complement component. In a separate experiment we attempted to reconstitute the hemolytic complement activity consumed by dapsone and clofazimine by adding C^{rat}-EDTA sera (a source of C3, C5, C6, C7, C8 and C9), but at most only 12% reconstitution of hemolytic activity could be achieved. We thus conclude that both dapsone and clofazimine could affect the complement system, predominantly through the earlier complement components and at very high, non-therapeutic doses. On the contrary, *in-vivo* experiments in rats showed that a combination of these three drugs, when given at a therapeutic dose or at 10 times the therapeutic dose for 3 months, did not affect the complement system.—Authors' Abstract

Salafia, A. and Ignatia. [Intermittent treatment with rifampin compared to intensive treatment in leprosy.] Rev. Leprol. Fontilles **16** (1988) 585–590. (in Spanish)

The authors report and compare the results of intensive and pulse therapy with rifampin in 244 patients.—Authors' English Summary.

THELEP Clinical Trials Subcommittee. Characteristics of the multiplication of dapsone-resistant strains of *Mycobacterium leprae* in mice. Lepr. Rev. **59** (1988) 5–10.

Twenty-seven percent of the 49 strains of *Mycobacterium leprae* isolated in the course of the THELEP controlled clinical trials of combined chemotherapy of lepromatous leprosy in Bamako and Chingleput, and found to be resistant to dapsone, multiplied in significantly fewer mice administered dapsone than in mice administered the dapsone-free diet.—AS (*From* Trop. Dis. Bull.)

Xu, R., *et al.* [Factors influencing the compliance of patients in MDT therapy in Anhui Province.] China Lepr. J. **4** (1988) 67–68. (in Chinese)

The sampling survey of multidrug therapy implementation in leprosy patients in six counties of Anhui Province, China, shows that the factors affecting the compliance of the patients mainly are their going out to work so that the visiting medical workers could not meet them. Therefore, it is necessary to popularize the knowledge of leprosy control more broadly and to persuade the patients to take the medicine on time.—Authors' English Abstract

Zeis, B. M. and Anderson, R. Clofazimine-mediated stimulation of prostaglandin synthesis and free radical production as novel mechanisms of drug-induced immunosuppression. Int. J. Immunopharmacol. **8** (1986) 731–739.

The effects of clofazamine (3-(*p*-chloroanilino)-10-(*p*-chlorophenyl)-2, 10-dihydro-2-(isopropylimino)-phenazine) at concentrations of 0.625–20 μg/ml on the mitogen-induced transformation, luminol-enhanced chemiluminescence, arachidonic acid metabolism and sulphydryl content of human mononuclear leukocytes (MNL) were investigated *in vitro*. The drug at all concentrations tested decreased MNL sulphydryl content and inhibited mitogen-induced transformation. Clofazimine increased the spontaneous luminol-enhanced chemiluminescence and activated the arachidonic acid cascade in MNL. The antioxidants ascorbic acid and cysteine and the prostaglandin (PG) synthesis inhibitor indomethacin were used individually and in combination to identify the primary mediators of the anti-proliferative effects of clofazimine on MNL. Combinations of an anti-oxidant with a PG synthesis inhibitor completely protected MNL from clofazimine-mediated inhibition of mitogen-induced transformation. These results show that the anti-proliferative activity of clofazimine is related to both the pro-oxidative and PG synthesis enhancing effects of the drug on MNL.—Authors' Abstract

Clinical Sciences

Anilkumar, G., Khedker, M. Y., Bhume, J. I. and Jawade, G. K. Malignant transformation of trophic ulcer in leprosy. Indian J. Lepr. **60** (1988) 385–388.

Malignancy developing in the trophic ulcer of leprosy is no more a rarity. In a four-year period we detected seven cases of squamous cell carcinoma developing in trophic ulcers in patients with lepromatous leprosy.—Authors' Abstract

Anilkumar, G., Sonvane, M. V., Nampalle, V. B. and Nathani, P. J. Tetanus in patient with lepromatous leprosy (I). Indian J. Lepr. **60** (1988) 448–449.

Tetanus in lepromatous leprosy is rare and reported occasionally as case reports only. We present a case of lepromatous leprosy who succumbed to death due to rapidly progressing tetanus. The mechanisms of protection from tetanus in leprosy are discussed.—Authors' Abstract

Anilkumar, G., Sonvani, M. V., Chaudhary, V. N., Nawaz, J. M. and Autee, G. S. Tetanus in leprosy patient (II). Indian J. Lepr. **60** (1988) 450–452.

Leprosy patients are protected from tetanus due to an acquired natural immunity against tetanus. The incidence of tetanus in leprosy is very low. A case of indeterminate leprosy developing tetanus following injury and terminating fatally is presented.—Authors' Abstract

Cherian, E., Vanaja, G., Krishnan, R. and Bhatia, V. N. Bacterial flora of ulcers treated by three types of dressings. Indian J. Lepr. **60** (1988) 389–392.

Effect of three types of dressings on bacterial flora in ulcers is presented. Debrisan (a highly hydrophilic dextran polymer) seemed to be more effective than zinc tape and collagen sheet in reducing the number of bacterial pathogens.—Authors' Abstract

Dhandayuthapani, S. and Bhatia, V. N. Lactate dehydrogenase isoenzymes in leprosy patients on multidrug therapy—a preliminary report. Indian J. Lepr. **60** (1988) 196–201.

Serum LDH (total) and LDH isoenzymes were studied in leprosy patients undergoing multidrug treatment. Serum LDH (total) did not show any significant difference between normal human subjects and patients but LDH isoenzymes have shown elevated levels in LDH_4 and LDH_5 in leprosy patients. The

M/H ratios were high in leprosy patients, and they exhibited a further rise in patients on treatment.—Authors' Abstract

Dharma Rao, T. and Rao, P. R. Serum immune complexes in erythema nodosum leprosum reactions of leprosy. Indian J. Lepr. **60** (1988) 189–195.

Serum estimations of immunoglobulins, complement components and their presence in circulating immune complexes were carried out in 39 lepromatous, 44 ENL, and 22 post-ENL leprosy patients. Serum IgG, IgA, IgM, C3 and C4 levels were determined by single radial immunodiffusion. Serum immune complexes were precipitated with polyethylene glycol (PEG) and IgG, IgA, IgM, C3 and C4 were estimated by single radial immunodiffusion and expressed as % of precipitation of their serum level. Decreased IgG, IgM; increased IgA and C3; and no change in C4 levels are observed in ENL than lepromatous and post-ENL patients. However, a gradual insignificant reduction of IgG, IgA, and IgM was found from lepromatous to ENL and post-ENL patients in the PEG-precipitates. Similarly, C3 and C4 was found reduced insignificantly in ENL than lepromatous and post-ENL patients. The significance of these estimations in relation to immune status of ENL reactions are discussed.—Authors' Abstract

Ghorpade, A., Ramanan, C. and Manglani, P. R. Tuberculoid leprosy on hairy scalp: a case report. Lepr. Rev. **59** (1988) 235–237.

Involvement of the hairy occipital area of scalp in a patient having tuberculoid leprosy is reported. To the best of our knowledge involvement of hairy scalp by a tuberculoid lesion has not been reported so far.—Authors' Summary

Guillet, G., Roudaut, M., Hily, M., Guillet, M. H., Bellein, M., Chastel, D. and Constant-Desportes, M. Leucocytic alkaline phosphatase activity, marker of evolution in leprosy? (Letter) J. Clin. Pathol **41** (1988) 920.

Lepromatous leprosy is an interesting disease regarding macrophage function and the host's failure to control the disease. The hypothesis that impaired nonspecific defenses might have a role in leprosy has become increasingly plausible, with speculation that macrophages are unable to present leprous antigens to the immune system. As impaired phagocytosis has been implicated, we undertook a survey of the whole phagocyte population. We chose to study leukocytic alkaline phosphatase (LAP) activity because of the similarity between lepromatous leprosy and mucocutaneous candidiasis: this latter disease, characterized by the persistence of *Candida* in spite of high titers of anticandida antibodies had been reported as showing a substantial decrease in LAP activity.

This work shows a correlation between LAP activity and leprosy with a progressive decrease of the score from tuberculoid to lepromatous leprosy. As the role of LAP is unknown, we cannot speculate whether it is a cause or consequence of infection. The role of granulocytes in protection against leprosy is dubious, and changes in granulocyte enzyme activity are likely to be epiphenomena, but we think that the LAP score might have a predictive value for the evolution of indeterminate leprosy.—(*From* the Letter)

Haldar, S. R., Pahwa, V. K., Ramadasan, P. and Tutakne, M. A. Tuberculoid granuloma in a clinically normal looking skin. Indian J. Lepr. **60** (1988) 277–279.

A case of tuberculoid leprosy showing well-defined tuberculoid granuloma in the skin without any morphological changes is reported.—Authors' Abstract

Kar, H. K. and Roy, R. G. Comparison of colchicine and aspirin in the treatment of type 2 lepra reaction. Lepr. Rev. **59** (1988) 201–203.

In a double-blind controlled trial, 34 episodes of acute type 2 reaction in patients with lepromatous leprosy were treated with colchicine (1.5 mg/day × 4) and the response was compared with a similar number of episodes treated with aspirin (1.8 g/day × 4). Both drugs were found equally effective in mild degree reaction; whereas colchicine gave marginally better results in

moderate degree reaction. Neither of the drugs was found useful in severe degree reaction. However, a better efficacy of colchicine was observed in the management of joint and nerve pain associated with type 2 reaction. Minor side effects like diarrhea, nausea and vomiting were noted in only one patient while under colchicine therapy.—Authors' Summary

Kumar, B., Khanna, V., Saxena, M. and Sharma, S. Survival of *Staphylococcus epidermidis* on the skin of patients with lepromatous leprosy. J. Appl. Bacteriol. **64** (1988) 471–473.

The effect of hydration on *Staphylococcus epidermidis,* the predominant resident bacterial flora, was studied on skin affected by leprosy and known to have impaired sweating. Normal areas served as control. Significantly higher bacterial counts were observed in affected areas compared with normal-looking skin in 16/19 of the patients. Artificial application of *S. epidermidis* on leprosy-affected and unaffected areas, however, showed equivocal results because in only 50% of the patients were higher counts obtained in affected compared with unaffected sites. The possible responsible factors for the present observation are discussed.—Authors' Abstract

Kumar, B., Yande, R., Kaur, I., Mann, S. B. S. and Kaur, S. Involvement of palate and cheek in leprosy. Indian J. Lepr. **60** (1988) 280–284.

Twenty-two cases of bacillary positive leprosy with no apparent lesion in the oral cavity, soft or hard palate were studied for any evidence of pathological involvement. Granulomata were present in 11 (65%) out of 17 cheek biopsies studied. *Mycobacterium leprae* were identified in four specimens only. Nine specimens (64%) out of 14 palate biopsies showed definite granulomata. *M. leprae* were seen in six specimens.—Authors' Abstract

Liu, Z., *et al.* [Survey of eye diseases in leprosy patients.] China Lepr. J. **4** (1988) 77–79. (in Chinese)

The ocular conditions of 44 leprosy patients in Tongren Leprosarium, Qinghai Province, China, were systematically examined, and all of them had various lesions in their eyes, being mostly madarosis, eyelash loss, lagophthalmos and old iridocyclitis. Those causing most damage to sight are cataract, iridocyclitis and exposure keratitis. The types of ocular lesions are related to the type and treatment of leprosy. The authors suggest some measures of treatment for the ocular conditions.—Authors' English Abstract

Montserrat Perez and Algaba, F. [Secondary amyloidosis as a consequence of inadequate treatment in a lepromatous leprosy patient.] Rev. Leprol. Fontilles **16** (1988) 569–574. (in Spanish)

Secondary amyloidosis can be found in 8%–10% of the patients with lepromatous leprosy. Amyloid deposits mainly in the parenchymatous organs such as the liver, the spleen, and the kidneys. It is extremely important to suspect the diagnosis of secondary amyloidosis in order to stain the slide with Congo red and argentic meteramina and an oxidation with Romany solution to differentiate the secondary amyloidosis from the primary amyloidosis. Our patient is a man of 70 years affected by lepromatous leprosy since 1948 who was not following specific treatment for the last 18 years.—Authors' English Summary

Naik, R., Bharathi, S. and Muktha Bai, B. Squamous cell carcinoma in trophic ulcer in leprosy. Indian J. Lepr. **60** (1988) 380–384.

Two cases of leprosy patients who had trophic ulcers over the heel and who later developed squamous cell carcinoma are reported along with follow up.—Authors' Abstract

Pavithran, K. Chromoblastomycosis in a residual patch of leprosy. Indian J. Lepr. **60** (1988) 444–447.

A middle-aged male who had adequate dapsone monotherapy for borderline tuberculoid leprosy developed chromoblastomycosis within the residual analgesic patch during the post-treatment follow-up period. *Cladosporium carrionii,* the causative fungus, was isolated from culture in Sabour-

aud's agar. There was prompt therapeutic response to oral ketoconazole. The possible factors for development of chromoblastomycosis in this patient are discussed.—Author's Abstract

Ramachandran, A. and Seshadri, P. S. Relapse or reversal reaction: the case for a therapeutic trial of steroids. (Letter) Lepr. Rev. **59** (1988) 271–272.

There is no doubt that it is difficult to distinguish relapse from reversal reaction by clinicobacteriological examination alone. Histopathology may be helpful, but the nonavailability of such a facility in many programs and the time taken for the report to be available, seriously delays the diagnosis of reversal reaction and its effective management. Hence we recommend a simple course of prednisolone, 30–40 mg daily for 2 weeks, to see if the signs of suspected reversal reaction subside (erythema and edema of dermal lesions). In such cases the disease will not flare up or disseminate if the patient is given antileprosy drugs simultaneously. We suggest that the clinical response to steroids may be a valuable indicator in this context.—(*From* the Authors' Comment)

Sehgal, V. N., Sharma, V. and Sharma, V. K. The effect of anti-reactional drugs on complement components in the type II, erythema nodosum leprosum, reaction. Br. J. Dermatol. **119** (1988) 255–258.

Seventeen patients with the type 2 (erythema nodosum leprosum; ENL) reaction were studied. They received multidrug therapy and also the antireactional drugs prednisolone, clofazimine or chloroquin, and we measured serum levels of complement components before treatment and after the reaction had subsided. Factor B was significantly elevated after treatment with each of the three drugs. C_3 levels were significantly increased after treatment, the largest change being in patients treated with clofazimine. In these patients there was also a concomitant decrease in C_{3d} levels. This suggests that clofazimine has complement modulating activity, and we would recommend it as the drug of choice in treatment of the ENL reaction.—Authors' Summary

Sehgal, V. N., Srivastava, G. and Sharma, V. K. Contemplative immune mechanism of Lucio phenomenon and its global status. J. Dermatol. **14** (1987) 580–585.

Lucio's phenomenon is infrequent in our experience. Only two young men on multidrug therapy were seen among 36 erythema nodosum leprosum reaction cases in the last 4 years. It first appeared as extensive crops of puerpuric macules which transformed into dome-shaped polygonal pustules and multiangular, bizarre, punched-out ulcers. Necrotic greyish-white debris was prominent; the histological features were diagnostic. Multidrug therapy seemed to have instigated the process. The classical as well as the alterative pathway of complement activation is incriminated in its probable immune mechanism.—Authors' Abstract

Shenoi, S. D. and Siddappa, K. Correlation of clinical and histopathologic features in untreated macular lesions of leprosy—a study of 100 cases. Indian J. Lepr. **60** (1988) 202–206.

Clinical and histopathological correlative studies carried out in 100 cases of leprosy with macular lesions revealed an overall parity in 47% of the cases. Disparity was observed in TT, BT, BB, BL and IL series but not in LL series. The variable tissue response in the disease spectrum due to the variability of cell-mediated immunity is responsible for the disparity in various types of leprosy, irrespective of the type of lesions, whether macular or elevated.—Authors' Abstract

Sirumban, P., Kumar, A., Durai, V. and Neelan, P. N. Diagnostic value of cardinal signs/symptoms in paucibacillary leprosy. Indian J. Lepr. **60** (1988) 207–214.

With the help of sensitivity and specificity criteria, an attempt is made to quantify the gain in certainty in diagnosis with the use of various cardinal signs/symptoms (S/s) of leprosy in order to study their predictive value in correct diagnosis of paucibacillary leprosy (PB) by the paramedical workers. The study was based on the findings in 326 new cases of paucibacillary leprosy detected by 10 paramedical workers during a recent field survey. Observations in the present

study confirm the scientific basis of the presently used combinations of cardinal S/s for the correct diagnosis of leprosy, especially the combination of (skin) patch with loss/impairment of sensation. The detailed observations made in the study are discussed in this communication.—Authors' Abstract

Soni, N. K. Gustatory rhinorrhoea syndrome: result or misreinnervation in leprosy. Indian J. Lepr. **60** (1988) 418–421.

A case of excessive rhinorrhea in response to taste stimulus due to misdirection of regenerating nerve fibers following the recovery of a facial nerve paralysis in leprosy is described under title of "gustatory rhinorrhea syndrome." The pathophysiology of such conditions is discussed in the light of available literature.—Author's Abstract

Soni, N. K. Radiological study of the paranasal sinuses in lepromatous leprosy. Indian J. Lepr. **60** (1988) 285–289.

Thirty patients of lepromatous leprosy have been studied by radiological investigation for affection of paranasal sinuses. It has been found that leprosy involves all groups of sinuses and the maxillary antrum is found to be more commonly affected. Diffuse hypertrophy type of lesion is more commonly recorded in maxillary antrum, in x ray of paranasal sinuses. The clinical significance and importance of extension of disease in the sinuses is discussed in the light of available literature.—Author's Abstract

Talwar, S. Spina bifida occulta with atrophy of toes. Indian J. Lepr. **60** (1988) 306–308.

A case of lumbosacral spina bifida occulta presented with resorption of toes which started at six years of age. Its differential diagnosis with neural leprosy is discussed.—Author's Abstract

Immuno-Pathology

Anderson, D. C., van Schooten, W. C. A., Barry, M. E., Janson, A. A. M., Buchanan, T. M. and de Vries, R. R. P. A *Mycobacterium leprae*-specific human T cell epitope cross-reactive with an HLA-DR2 peptide. Science **242** (1988) 259–261.

Mycobacterium leprae induces T-cell reactivity and protective immunity in the majority of exposed individuals, but the minority who develop leprosy exhibit various types of immunopathology. Thus, the definition of epitopes on *M. leprae* antigens that are recognized by T cells from different individuals might result in the development of an effective vaccine against leprosy. A sequence from the 65-kD protein of this organism was recognized by two HLA-DR2-restricted, *M. leprae*-specific, helper-T-cell clones that were derived from a tuberculoid leprosy patient. Synthetic peptides were used to define this epitope as Leu-Gln-Ala-Ala-Pro-Ala-Leu-Asp-Lys-Leu. A similar peptide that was derived from the third hypervariable region of the HLA-DR2 chain, Glu-Gln-Ala-Arg-Ala-Ala-Val-Asp-Thr-Tyr, also activated the same clones. The unexpected crossreactivity of this *M. leprae*-specific, DR2-restricted T-cell epitope with a DR2 peptide may have to be considered in the design of subunit vaccines against leprosy.—Authors' Abstract

Bhatki, W. S., Chullawala, R. G., Chaturvedi, R. M., Dixit, G. M. and Deo, M. G. Lepromin conversion induced by a "subunit" vaccine from ICRC bacilli. Indian J. Med. Res. **87** (1988) 545–554.

A sonicate of ICRC bacilli yielded on gel permeation HPLC a major high molecular weight (apparent mol wt 1000K) glycolipoprotein, PP-1, and a number of low molecular weight peaks (the pooled fraction named PP-II). PP-I induced Mitsuda-type skin reaction in healthy subjects. When ad-

ministered as a vaccine, PP-I also induced lepromin conversion in lepromatous leprosy patients and their lepromin-negative healthy household contacts. In view of the importance of the lepromin test as an index of host immunity, the possibility of using PP-I in the preparation of a "sub-unit," antileprosy vaccine is discussed.—Authors' Abstract

Chirmule, N. B., Mulherkar, R. and Deo, M. G. Antigenic profile of ICRC bacilli with special reference to isolation of immunogenic subunit. Int. Arch. Allergy Appl. Immunol. **86** (1988) 19–27.

A vaccine containing ICRC bacilli induces persistent immune conversion in lepromatous leprosy (LL) patients and lepromin-negative healthy subjects, in association with upgrading of the tissue responses in the former. With an idea to isolate the immunogenic "subunit(s)," antigenicity of ICRC sonicate and its fractions were tested, with reference to both B- and T-cell responses. A very high molecular weight glycolipoprotein, named PP-I with an apparent molecular weight of 1,000,000, has been isolated using gel permeation high performance liquid chromatography (HPLC). PP-I, which focused as a single band at pH 5 in an LKB isoelectric focusing column, quantitatively interacted with 80% of the circulating antibodies in pooled LL sera, and also induced a late (3 weeks) Mitsuda-type skin response which shows excellent correlation with host immunity against *Mycobacterium leprae.* These observations suggest that PP-I is a complex bifunctional antigen containing epitopes for both B and T cells. The PP-I fraction of ICRC and a similar high molecular weight HPLC fraction of *M. leprae* produced a line of identity against rabbit anti-ICRC serum in Ouchterlony gel diffusion, and gave comparable skin responses in healthy volunteers in leprosy endemic areas. The data indicate that the PP-I fractions from the two organisms are antigenically closely related. Preliminary studies in human volunteers showed that administration of PP-I of ICRC resulted in immune conversion in lepromin-negative healthy subjects. PP-I thus appears to be the appropriate immunogen that could be used in preparation of a "subunit" antileprosy vaccine.—Authors' Abstract

Desai, S. D., Birdi, T. J. and Antia, N. H. Presence of *Mycobacterium leprae*-reactive lymphocytes in lymph nodes of lepromatous leprosy patients. Scand. J. Immunol. **28** (1988) 211–216.

A critical problem in leprosy is the relative deficiency of antigen-specific, T-cell-mediated immunity. We were successful in detecting a significant response to viable *Mycobacterium leprae* in mononuclear cells isolated from the lymph nodes of lepromatous leprosy patients in contrast to the apparent *M. leprae*-specific anergy seen in the peripheral blood. This observation suggests that antigen-reactive lymphocytes are generated in the lymph nodes of lepromatous patients but the inability to detect them in the circulation may be due either to a different processing and presentation of mycobacterial antigens within the peripheral blood and lymph node compartments or to a selective sequestration of lymphocytes within the lymph node.—Authors' Abstract

Gibbels, E., Behse, F., Klingmüller, G., Henke-Lübke, U., Haupt, W. F. and Gollmer, E. Sural nerve biopsy findings in leprosy: a qualitative and quantitative light and electron microscope study in 4 treated cases of the lepromatous spectrum. Clin. Neuropathol. **7** (1988) 120–130.

Reports on biopsy findings in multifascicular nerves in lepromatous leprosy (LL) are rare, and detailed morphometrical data are not available. In a case of early LL with normal electrodiagnostic findings in sural nerve, the present study revealed marked segmental de- and remyelination concomitant with the sequelae of considerable Wallerian degeneration of preferentially small myelinated fibers (MF) in spite of a normal number/nerve and density/mm^2. Segmental de- and remyelination of several consecutive internodes in teased fibers suggest continuous bacterial spread via Schwann cells. In two more advanced LL cases, nervous parenchyme was severely reduced, in a borderline lepromatous (BL) case obviously in part caused by cell infiltrates and granulomata. Distinct fascicle differences in

MF involvement were demonstrated by coefficients of variation of MF/mm^2 and teased fiber preparations in LL, consistent with the hypothesis of initial focal spread of bacteria. Numbers and densities of endoneurial vessels were increased only in the later stages of LL. Enlargement of endoneurial area, due to different factors, was encountered except for the most severe LL case with extensive endoneurial collagenization. Morphometric results were compared with those of other neuropathies. Intact and degenerating bacteria mostly in phagosomes of Schwann cells associated with unmyelinated axons and in macrophages were seen only in the early LL and the BL case. Sparse mononuclear cell infiltrates and small focal necrosis, present even in LL cases, underline the complex pathogenesis of nerve fiber involvement.—Authors' Abstract

Kumar, P., Bajaj, M. M. and Swaroop, B. Conformational changes in the IgG molecule of lepromatous sera using laser Raman spectroscopy. Indian J. Lepr. **60** (1988) 363–373.

In the present work we report our studies on IgG separated from the serum of lepromatous patients and nonlepromatous leprosy cases using laser Raman spectroscopy. Striking spectral changes in lepromatous leprosy cases have been observed in the following special regions: a) the amide I and III, b) the S-S and C-S stretching, c) the skeletal bending, and d) skeletal stretching regions. These changes indicate a decrease in the amount of β-structure and a transition towards α-helical conformation.—Authors' Abstract

Kumar, V., Malaviya, G. N., Narayanan, R. B. and Nishiura, M. Ultrastructural studies on peripheral nerves in lepromatous leprosy patients. Indian J. Lepr. **60** (1988) 360–362.

Ultrathin sections of the peripheral nerves taken from three lepromatous leprosy patients (one untreated, another treated, and a third in ENL reaction) were examined in the electron microscope. In the untreated patient, solid *Mycobacterium leprae* organisms inside the Schwann cell and degeneration of Schwann cell were seen. In contrast, the treated patient showed degeneration of bacilli and myelinated fibers. However, the characteristics of the cells in the ENL reaction showed close similarities with those in the untreated case.—Authors' Abstract

Moudgil, K. D., Gupta, S. K., Srivastava, L. M., Mishra, R. and Talwar, G. P. Evaluation of an enzyme immunoassay based on sonicate supernatant antigens of *Mycobacterium w* for immunodiagnosis of leprosy. Indian J. Lepr. **60** (1988) 159–172.

An enzyme immunoassay (EIA) based on sonicate supernatant antigens of a cultivable, atypical bacterium, *Mycobacterium w* (*M. w*), for the immunodiagnosis of leprosy is described. *M. w* was selected after screening of sonicate supernatant antigens of seven cultivable mycobacteria in EIA. The results of the assay were compared with that of EIA using phenolic glycolipid-I (PGL-I). The *M. w* assay was more sensitive than PGL-I based EIA for detection of leprosy patients of all categories, including long-term-treated patients with low bacterial load. The *M. w* assay was highly sensitive (93.49%) for detection of active LL patients, and the difference in the positivity of the two assays for LL patients was statistically significant (p 0.05). The combined positivity of the assays with *M. w* and PGL-I for LL was higher than that with either antigen alone. *M. w* assay, in addition, was also highly sensitive for detection of patients with active pulmonary tuberculosis.—Authors' Abstract

Mwantha, J., Moreno, C., Sengupta, U., Sinha, S. and Ivanyi, J. A comparative evaluation of serological assays for lepromatous leprosy. Lepr. Rev. **59** (1988) 195–199.

A comparative antibody analysis of sera from 26 patients with lepromatous leprosy showed consistently high titers to the phenolic glycolipid-I disaccharide and to the ML04 epitope of the 35-kDa protein antigen of *Mycobacterium leprae*. Antibody titers of these two specificities were positively correlated ($p < 0.01$) and both declined after chemotherapy, although this trend was

apparent earlier after the onset of therapy for the anti-35-kDa antibody response. Two healthy subjects (out of 18 tested) from the leprosy-endemic area had pronounced anti-PGL-I but no demonstrable anti-35-kDa antigen activities. In contrast with the above results, antibody levels to lipoarabinomannan were much lower and with great individual variation between the LL patients. Finally, antibody levels to the *M. leprae*-specific IIIE9 epitope (peptide 422–436) of the 65-kDa protein antigen were not demonstrable in the majority of LL patients.—Authors' Summary

Neill, M. A. and Klebanoff, S. J. The effect of phenolic glycolipid-I from *Mycobacterium leprae* on the antimicrobial activity of human macrophages. J. Exp. Med. **167** (1988) 30–42.

Purified phenolic glycolipid-I (PGL-I) and deacylated PGL-I (dPGL) from *Mycobacterium leprae* can prevent bacterial killing by intact phagocytes and cell-free antimicrobial systems. Both glycolipids completely abolished the antimicrobial effect of the acetaldehyde-xanthine oxidase (XO)-Fe^{2+} system. Because the cytotoxicity of this system is inhibited by catalase, superoxide dismutase (SOD), mannitol, and ethanol, but not by heated SOD or catalase, these data suggest that toxicity is due to $OH^{\cdot}$ generated by the Haber-Weiss reaction. That the antimicrobial killing in the XO system is completely blocked by the addition of PGL-I or dPGL suggests that these glycolipids can act as $OH^{\cdot}$ scavengers. A modest protective effect against the cytotoxicity of the myeloperoxidase (MPO)-H_2O_2-halide system by both PGL-I and dPGL was also observed. The antimicrobial activity of the MPO system was abolished with chloride, but not iodide, as the halide. The effect of the *M. leprae*-derived glycolipid on bacterial killing by intact phagocytes was examined. Two linking antibodies were used to bind the dPGL to a rapidly growing test organism, *Staphylococcus aureus,* a murine IgM monoclonal antibody specific for the terminal glycoside of PGL-I, and a rabbit IgG anti-mouse IgM which bound to staphylococcal protein A via its Fc region. Examination by transmission electron microscopy of human monocyte-derived macrophages which had ingested staphylococci either coated with both antibodies and dPGL, or coated only with the IgG and IgM antibodies, demonstrated the presence of bacteria in phagosomes of control and gamma-interferon (IFN-γ)-activated macrophages. Activation of the macrophage monolayers by pretreatment with IFN-γ markedly increased their staphylocidal activity. When dPGL-coated staphylococci were ingested, killing by both control and IFN-γ-activated macrophages was completely blocked. These results, suggesting that PGL-I can scavenge reactive oxygen species and prevent microbial death within the phagosome, may in part explain the intracellular survival of *M. leprae* in certain cell types.—Authors' Summary

Okhandiar, R. P., Sinha, E., Mishra, A. D. and Sinha, R. K. Turn-over of statum corneum in leprosy. Indian J. Dermatol. Venereol. Leprol. **53** (1987) 162–163.

Stratum corneum showed increased proliferative activity on the patches of leprosy as evidenced by a significantly fast stratum corneum turn-over time ($p < 0.001$) measured by fluorescent staining technic with dansyl chloride. These findings suggest imperfect keratinization on the patches of leprosy leading to formation of structurally weak stratum corneum.—Authors' Abstract

Ottenhoff, R. and de Vries, R. R. P. *Recognition of M. leprae Antigens.* Dordrecht, The Netherlands: Martius Nijhoff Publishers, 1987.

This book is essentially a collection of the authors' work on the T-cell recognition of leprosy antigens. There is an introductory section on immunology, immune response genes, the major histocompatibility complex, and leprosy. Subsequent chapters describe the cloning of T cells from leprosy patients, both T-helper and T-suppressor cells, specific for leprosy antigens and the restriction elements used by the T-helper-cell clones. Further chapters investigate the association between particular HLA class II antigens such as HLA-DR3 and tuberculoid leprosy, and the possibility that HLA-DR4 is an immune response gene for *Mycobac-*

terium tuberculosis. All the chapters are comprehensively referenced.

The chief weakness of the book is that (with the exception of the introduction and final discussion) the separate chapters are reproduced in the formats of the journals in which much of the work has been published. Thus there will not be much new for those familiar with the work of the authors, but the book will provide others with an opportunity to read their collected contributions to the field of T-cell recognition of leprosy antigens.—H. M. Dockrell (*From* Trop. Dis. Bull.)

Plaksin, D. Y., Ermolin, G. A., Shipina, L. K. and Vladimirsky, M. A. [Determination of antibodies to mycobacterial antigens in tuberculosis by the method of erythroimmunoadsorption with a rosette marker.] Zh. Mikrobiol. Epidemiol. Immunobiol. **8** (1988) 79–82. (in Russian)

A solid-phase enzyme immunoassay system for the determination of antibodies to mycobacterial antigens, based on the method of erythroimmunoadsorption in microchambers for immunological reactions, has been developed. To detect antibodies specifically bound with the solid-phase antigen, the affinity rosettes of *Staphylococcus aureus* strain Cowan 1, carrying protein A, with erythrocytes conjugated with human gamma globulin have been used. The significant correlation of the titers of 34 sera, determined by means of erythroimmunoadsorption, with extinction values obtained in the solid-phase enzyme immunoassay of antibodies to *Mycobacterium tuberculosis* has been established. The coincidence of the results in 92% of cases has been noted.—Authors' English Abstract

Rumschlag, H. S., Shinnick, T. M. and Cohen, M. L. Serological responses of patients with lepromatous and tuberculoid leprosy to 30-, 31-, and 32-kilodalton antigens of *Mycobacterium tuberculosis.* J. Clin. Microbiol. **26** (1988) 2200–2202.

Sera from patients with lepromatous and tuberculoid leprosy were examined in immunoblot assays for antibodies to *Mycobacterium tuberculosis* culture filtrate antigens. Antibodies to 30- and 31-kilodalton proteins were present in 88% and 81%, respectively, of 16 patients with lepromatous disease and absent in 16 patients with tuberculoid disease. Antibodies to a 32-kilodalton protein were found in 12% and 38% of lepromatous and tuberculoid patients, respectively. These reactivities may be useful for distinguishing lepromatous and tuberculoid leprosy.—Authors' Abstract

Sibley, L. D., Hunter, S. W., Brennan, P. J. and Krahenbuhl, J. L. Mycobacterial lipoarabinomannan inhibits gamma interferon-mediated activation of macrophages. Infect. Immun. **56** (1988) 1232–1236.

The principal efferent role of the macrophage in acquired resistance to intracellular pathogens depends on activation by T-cell lymphokines, primarily gamma interferon (IFN-γ). However, mouse macrophages that are heavily burdened with *Mycobacterium leprae* are refractory to activation by IFN-γ and are thus severely compromised in their capacity for both enhanced microbicidal and tumoricidal activities. We report here that lipoarabinomannan (LAM), a highly immunogenic lipopolysaccharide that is a prominent component of the cell walls of *M. leprae* and *M. tuberculosis,* was a potent inhibitor of IFN-γ-mediated activation of mouse macrophages *in vitro.* Inhibition of macrophage activation by LAM required preincubation for approximately 24 hr, resulting in uptake of LAM into cytoplasmic vacuoles of macrophages. Intact LAM was necessary to inhibit IFN-γ-mediated activation, since this property was lost when the acyl side chains were removed from LAM by mild alkaline hydrolysis. In addition, LAM was an abundant constituent of macrophages isolated from lepromatous granulomas of *M. leprae*-infected nude mice and likely contributed to the defective activation of granuloma macrophages by IFN-γ.—Authors' Abstract

Singh, N. B., Srivastava, A., Gupta, H. P., Kumar, A. and Chaturvedi, V. K. Relative cross reactivity of habanin, lepromin and tuberculin in guinea pigs sensitized with homologous and heterologous mycobacteria. Indian J. Lepr. **60** (1988) 407–412.

An atypical strain *Mycobacterium habana* has been studied for its antigenic crossreactivity with delayed-type hypersensitivity responses in guinea pigs. Guinea pigs sensitized with *M. habana, M. leprae* and *M. tuberculosis* when challenged with habanin, lepromin and tuberculin in criss-cross fashion have demonstrated strong cross-reactivity with each other. Possibilities of developing *M. habana* as a vaccine against tuberculosis and/or leprosy are discussed.—Authors' Abstract

Sreevatsa and Desikan, K. V. Evaluation of the efficacy of candidate vaccines against *M. leprae* infection in mice. Indian J. Lepr. **60** (1988) 252–259.

Delayed-type hypersensitivity (DTH) responses and the protection value of some of the candidate vaccines alone and in combination with BCG have been investigated in mice. It was observed that both *M. w.* and BCG gave heightened DTH and good protection. On the other hand both *M. leprae* and ICRC evoked moderate DTH and gave poor protection. However on combining any of these candidate vaccines with live BCG, the lowering of DTH and poor protection were observed except in the *M. leprae* combination which in spite of low DTH gave better protection.—Authors' Abstract

Steinhoff, U. and Kaufmann, S. H. E. Specific lysis by CD8+ T cells of Schwann cells expressing *Mycobacterium leprae* antigens. Eur. J. Immunol. **18** (1988) 969–972.

In vitro-cultured murine Schwann cells which were devoid of class I and class II gene products of the major histocompatibility complex expressed class I, though not class II, antigens after stimulation with recombinant interferon-γ. Recombinant IFN-γ-stimulated Schwann cells after priming with *Mycobacterium leprae* were lysed by antigen-specific CD8+ T lymphocytes *in vitro*. These findings suggest that specific lysis of *M. leprae*-infected Schwann cells by CD8+ CTL plays a role in leprosy.—Authors' Abstract

Vaishnavi, C., Ganguly, N. K., Kumar, B. and Kaur, S. Effect of *in vitro* formed immune complexes on macrophage functions of *Mycobacterium leprae* infected mice. Indian J. Lepr. **60** (1988) 242–251.

Nonspecific macrophage functions were studied in *Mycobacterium leprae*-infected and preformed immune complex (IC) administered normal (NI) and thymectomized/irradiated (TRI) mice at different time periods. Uninfected controls given IC were also included. Significant decreases in the chemotaxis, phagocytosis and bactericidal activities of macrophages obtained from infected groups compared to their controls were observed. Phagocytic and chemotactic activities of macrophages were normal but intracellular killing was seen to be depressed in studies conducted in normal and thymectomized immunosuppressed groups which were not administered with preformed IC.—Authors' Abstract

van Schooten, W. C. A., Ottenhoff, T. H. M., Klatser, P. R., Thole, J., de Vries, R. R. P. and Kolk, A. H. T cell epitopes on the 36K and 65K *Mycobacterium leprae* antigens defined by human T cell clones. Eur. J. Immunol. **18** (1988) 849–854.

To identify the molecular localization and specificity of *Mycobacterium leprae* antigenic determinants inducing T-cell activation, we studied the reactivity of *M. leprae*-reactive T-cell clones from two tuberculoid leprosy patients toward a battery of different mycobacterial strains and purified mycobacterial antigens. Of the 38 T-cell clones tested 8 appeared to be *M. leprae* specific (specificity A); another 8 were crossreactive with at least one of the three mycobacterial strains, *M. lepraemurium, M. vaccae* and *M. scrofulaceum* (specificity B); 5 were reactive with most but not all strains (specificity C); and the remaining 18 were reactive with all 17 mycobacterial strains tested (specificity D) but not with nonmycobacterial antigens. All T-cell clones were tested with the 36K and 65K antigen isolated from *M. leprae,* and with the *M. leprae* and *M. bovis* BCG 65K proteins produced in *Escherichia coli* by recombinant DNA. Four T-cell clones appeared to recognize epitopes on the 36K antigen; nine T-cell clones recognized the

65K antigen. These two *M. leprae* antigens, 36K and 65K, thus seem to contain major T-cell epitopes. At least three different epitopes could be defined on the 36K antigen of which one is *M. leprae* specific, one of specificity B and one of specificity C. Two distinct epitopes were discerned on the 65K antigen of which one is *M. leprae* specific and one of specificity D. The *M. leprae*-specific epitopes on the 36K and 65K antigen may help in the development of a specific serodiagnostic and skin test.—Authors' Abstract

Microbiology

Antoine, I., Coene, M. and Cocito, C. Size and homology of the genomes of leprosy-derived corynebacteria, *Mycobacterium leprae,* and other corynebacteria and mycobacteria. J. Med. Microbiol. **27** (1988) 45–50.

The genomes of *Mycobacterium leprae* and leprosy-derived corynebacteria (LDC), which have a similar base composition of guanine + cytosine 56 mol%, have been compared with those of reference bacteria of the CMN group (genera *Corynebacterium, Mycobacterium, Nocardia*). Genome sizes of three LDC strains were (1.2–2.5) × 10^6 base pairs. DNA from four of seven LDC strains examined had homology levels >60%. Two other strains had a homology of 40% when compared with the CMN strains and one strain was distinctly different. The DNA from all seven LDC strains gave 0.3–18% hybridization with that of *M. leprae,* 5–16% with reference corynebacteria, 5–12% with *M. bovis,* and 2-8% with *Nocardia caviae.* The small size of the LDC genome and its unrelatedness to those of *M. leprae* and organisms of the CMN group show the uniqueness of LDC.—Authors' Summary

Bhatia, V. N. Filamentous phase in life cycle of *M. leprae*(?): a preliminary communication. Indian J. Lepr. **60** (1988) 422–426.

Certain structures which indicate probable involvement of a filamentous phase in the life cycle of *Mycobacterium leprae* have been noted in preserved skin biopsy suspensions from lepromatous leprosy cases. These include a) filaments with empty or pink round spaces within them, b) conidia-like structures, and c) membranes with acid-fast bacilli. These structures were rare in the fresh material.—Author's Abstract

Dhople, A. M. and Osborne, L. J. Presence of mycobactin-like substance in *Mycobacterium leprae.* Indian J. Lepr. **60** (1988) 348–359.

Chloroform extracts of *Mycobacterium leprae* suspensions—crude, partially purified and purified—were prepared by standard methods. Similar extracts were also prepared from the livers of normal armadillos using the same methods that were used to prepare crude and partially purified *M. leprae* suspensions. The only chloroform extract that supported the growth of *M. paratuberculosis* was the one prepared from Percoll gradient-purified *M. leprae.* Four other extracts not only did not support the growth of mycobactin-dependent *M. paratuberculosis,* but also inhibited the growth of mycobactin-independent strain of *M. paratuberculosis.* These results suggest the presence of mycobactin-like substance in *M. leprae,* and also, the presence of other unknown substance(s) in the crude suspensions of armadillo livers that inhibits the growth of *M. paratuberculosis.*—Authors' Abstract

Mor, N., Resnick, M., Silbaq, F., Bercovier, H. and Levy, L. Reduction of tellurite and deesterification of fluorescein diacetate are not well correlated with the viability of mycobacteria. Ann. Inst. Pasteur/Microbiol. **139** (1988) 279–288.

Both *Mycobacterium leprae* and *M. lepraemurium* (MLM) were capable of reducing tellurium as tellurite ion (Te^{4+}) to ele-

mental tellurium (Te), seen by electron microscopy as fine crystals within the bacterial cells. There appeared to be close correspondence between the capacity to reduce tellurite, bright green fluorescence after staining with fluorescein diacetate (FDA) and the ability of *M. smegmatis* to multiply in culture. Likewise, there appeared to be correspondence between tellurite reduction and fluorescence after FDA staining for MLM subjected to prolonged storage in the cold or to heating at 70°C. However, correspondence with tellurite-reduction or fluorescence after FDA staining was not observed when death of MLM occurred *in vivo*.—Authors' Summary

Wheeler, P. R. and Ratledge, C. Metabolism in *Mycobacterium leprae, M. tuberculosis* and other pathogenic mycobacteria. Br. Med. Bull. **44** (1988) 547–561.

Pathogenic mycobacteria have complex lipoidal cell walls. Most of them secrete further lipids which appear as a layer around intracellular organisms. This lipoidal exterior may protect mycobacteria inside macrophages from attempts that those host cells make to kill them. Such protection could be especially important in *Mycobacterium leprae* which unusually lacks catalase, an important "self-defense" enzyme.

Intracellular mycobacteria must obtain key nutrients from the host. The role of mycobactin and exochelin in acquiring iron, the carbon and nitrogen sources—including metabolic intermediates—used, and control of biosynthetic pathways are discussed. *M. tuberculosis* is capable of synthesizing all its macromolecules but *M. leprae* depends on the host for purines (precursors of nucleic acids), and maybe other intermediates. Pathogenic mycobacteria grow slowly, and the possibilities that permeability of the envelope to nutrients, catabolic or anabolic (particularly DNA, RNA synthesis) reactions are limiting to growth are considered.

Some characteristic activities may represent targets for antimycobacterial agents.—Authors' Abstract

Experimental Infections

Moreno, O. S. and Silveira, J. R. [Effect of removal of the popliteal ganglion on multiplication of *Mycobacterium leprae* in the mouse foot-pad: preliminary report.] Rev. Cubana Med. Trop. **39** (1987) 17–22.

BALB/c mice that had had the popliteal lymph node removed 3 weeks before foot pad inoculation with *Mycobacterium leprae* yielded a significantly greater harvest of bacilli (8 months later) than intact mice.—(*From* Trop. Dis. Bull.)

Epidemiology and Prevention

Aytekin, A. H. and Saylan, T. Close-contact surveys and mass-screening studies for leprosy in Turkey. Lepr. Rev. **59** (1988) 225–229.

Beginning in 1984, the Department of Dermatology at Istanbul University Medical School and the Department of Public Health of Uludağ University Medical School embarked on: a) close contact surveys; and b) mass-screening studies in the Province of Van in Turkey. Methodology and results are described in detail. The total number of cases in the whole country is unlikely to exceed 4300 and leprosy cannot be considered to be a serious public health problem. However there is room for improvement, notably in compliance to prescribed medication, the reduction of disability rates and the better use of general health units.—Authors' Summary

Aytekin, A. H. and Saylan, T. Leprosy in Turkey. Lepr. Rev. **59** (1988) 231–234.

An account is given of the historical development of leprosy work and control measures in Turkey. Detailed information is recorded on the distribution of the disease according to year of registration, age, sex, classification. After thorough examination of the patient registers and other sources of information, it can now be confidently stated that reliable data exist for a total of 3851 leprosy patients in Turkey. Studies of distribution of cases in the provinces and regions reveal some curious discrepancies between areas of high and low prevalence, not explained by socio-economic or other factors. The systematic examination of registers and other records, as described in this article, may be of value in other countries, especially when the incidence rate is decreasing, in defining the overall problem and maintaining the interest of health authorities and personnel.—Authors' Summary

Bhatki, W. S. Case detection; are the present survey methods effective? A review of leprosy surveys in Bombay. Lepr. Rev. **59** (1988) 239–244.

The results of active surveys carried out in Bombay during the last 15 years show that such surveys predominantly detect noninfectious cases with 1–2 skin lesions. Considering the work input in terms of field workers' days required to detect each case, particularly an infectious case, the present survey methods are not cost effective. Health education is found to be more effective and efficient in case detection than active surveys. Modified methods which can identify infectious cases at an early stage are discussed and suggested.—Author's Summary

Burgess, P. J., Fine, P. E. M., Ponnighaus, J. M. and Draper, C. Serological tests in leprosy. The sensitivity, specificity and predictive value of ELISA tests based on phenolic glycolipid antigens, and the implications for their use in epidemiological studies. Epidem. Infect. **101** (1988) 159–171.

This paper examines the sensitivity and specificity of two ELISA assays for IgM antibodies to *Mycobacterium leprae,* one employing natural phenolic glycolipid and the other employing a synthetic disaccharide glycoconjugate as antigen. Estimates of sensitivity and specificity are derived, based on a panel of sera from leprosy cases in Malawi and various nonleprosy controls from the U.K. Although both assays were able to identify a high proportion of multibacillary patients, neither was able to detect a high proportion of paucibacillary patients without considerable loss of specificity. The implications of the inverse relationship between sensitivity and specificity are discussed with reference to the predictive value of such tests in such areas as Malawi, where the large majority of cases are paucibacillary.—Authors' Summary

Cem Mat, M., Yazici, H., Özbakir, F. and Tüzün, Y. The HLA association of lepromatous leprosy and borderline lepromatous leprosy in Turkey; a preliminary study. Int. J. Dermatol. **27** (1988) 246–247.

Among 50 patients with lepromatous leprosy and borderline lepromatous leprosy in Turkey, the prevalence of HLA-DR2 was 25/50 (50%). The prevalence of the same alleles among 50 healthy controls was 13/50 (26%).—Authors' Abstract

Chen, D. [Endemicity of leprosy and its control in Zhejiang Province.] China Lepr. J. **4** (1988) 65–67. (in Chinese)

The accumulated number of leprosy patients decreased from 16,022 to 961 by 1986 in Zhejiang Province, China. In the 1950s the case-finding work was placed in the charge of special clinics. From the 1960s various surveys were launched for case finding and the isolation and treatment of the patients in leprosaria began. In the 1980s the measures for controlling leprosy included mobilizing all medical workers to take part in leprosy control work, popularizing knowledge of the diagnosis of leprosy, finding patients in the early stages of the disease by multiple methods and treating them with multiple drug therapy in their homes. Ten years after the beginning of leprosy control, the incidence of the disease began to decline and by 1984 the incidence had decreased

from 3.51 (1958) to 0.15 per 100,000, the prevalence from 0.26 to 0.08 per million, and the proportion of cured patients in a year increased to 34.28%.—Author's English Abstract

Chen, P. C. Y. Longhouse dwelling, social contact and the prevalence of leprosy and tuberculosis among native tribes of Sarawak. Soc. Sci. Med. **29** (1988) 1073–1077.

In Sarawak [Malaysia], some tribes stay in communal longhouses while others live in villages of single dwellings. The present study looks into the question of whether there is an association between the prevalence of leprosy and tuberculosis with the quantum of social contact that occurs in these two types of settlement patterns. It was found that the prevalence of leprosy and tuberculosis is significantly higher among longhouse dwellers compared with single-house dwellers. It was also noted that social groups tended to be larger and to persist for much longer among longhouse dwellers than among those in single dwellings. This lends support to the evidence that social contact in longhouses is more extensive and contributes toward a higher prevalence of leprosy and tuberculosis.—AS/A. C. McDougall (*From* Trop. Dis. Bull.)

Goyder, E. C. Leprosy control in a Bombay slum—a general assessment. Lepr. Rev. **59** (1988) 245–253.

During the course of a medical student elective period, the author collected data from one of the largest leprosy control projects in the slums of Bombay, where the disease is hyperendemic. Particular attention was given to case-detection rates over a period of 5 years, drop-out rates, disability-deformity, stigma and socio-economic conditions. In this retrospective study, carried out during a limited period of time in one project, it seems that compliance, regularity of attendance and utilization by the patients of the excellent services offered all run at a level which is often disappointingly low. The current priority is for improved case-holding and some of the factors needed to bring this about are discussed.—Author's Summary

Jazwinska, E. C. and Serjeantson, S. W. HLA-DR, -DQ DNA genotyping and T-cell receptor RFLPs in leprosy. Dis. Markers **6** (1988) 173–183.

HLA-DR and -DQ restriction fragment length polymorphisms (RFLPs) were examined in Melanesian leprosy patients and controls from New Caledonia. This permitted DNA subtyping of DQwl, a broad serological specificity previously implicated in predisposition to lepromatous leprosy. The DQwlc subtype, found in linkage disequilibrium with DR1, w10, w14, and some Pacific Island variants of DRw6 and DRw8, was significantly reduced in leprosy patients. Since the association between HLA-DR genes and leprosy is not strong, some candidate non-MHC genes for leprosy susceptibility were examined also. T-cell receptor -α, -β, and -γ gene RFLPs revealed no germ-line defects or major clonal T-cell expansion in either lepromatous or tuberculoid leprosy patients. The human homologue of the murine *Ity* locus which determines murine susceptibility to *Mycobacterium lepraemurium* was sought by examining linkage disequilibrium with RFLPs in the human γ-crystallin genes, since this gene family forms a syntenic group with isocitrate dehydrogenase-1 in both mouse and man and, in the mouse, this cluster is closely linked to the *Ity* locus. These RFLPs were not associated with leprosy susceptibility in man.—Authors' Summary

Jesudasan, K., Vijaykumaran, P., Pannikar, V. K. and Christian, M. Impact of MDT on leprosy as measured by selective indicators. Lepr. Rev. **59** (1988) 215–223.

The impact of multidrug therapy (MDT) on the leprosy situation in endemic districts where MDT has been introduced is studied, using a hypothetical model. This analysis indicates that there will be significant falls in prevalence rates during the first 5 years, mainly as a result of discharge of cases during screening and due to shortening of the duration of treatment. These changes have to be interpreted with caution. Already some districts like Wardha in India have shown dramatic falls in prevalence rates from 11.1 in 1981 to 1.8 in 1987. The impact of MDT on disease transmission as

measured by decline in incidence rates and case detection rates will, however, be gradual.—Authors' Summary

Lange, K. A test statistic for the affected-sib-set method. Ann. Hum. Genet. **50** (1986) 283–290.

This paper discusses generalizations of the affected-sib-pair method. First, the requirement that sib identity-by-descent relations be known unambiguously is relaxed by substituting sib identity-by-state relations. This permits affected sibs to be used even when their parents are unavailable for typing. In the limit of an infinite number of marker alleles each of infinitesimal population frequency, the identity-by-state relations coincide with the usual identity-by-descent relations. Second, a weighted pairs test statistic is proposed that covers affected sib sets of size greater than two. These generalizations make the affected-sib-pair method a more powerful technique for detecting departures from independent segregation of disease and marker phenotypes. A sample calculation suggests such a departure for tuberculoid leprosy and the HLA-D locus.—Author's Summary

Livorato, F., de Oliveira, I. M., de Abreu, M. H., Kumagal, M. T., de Almeida, I. S., Ferreira, M. S. and Ribeiro, W. S. M. [Epidemiological aspects of hanseniasis in Uberlandia, Minas Gerais (Brazil) (1973–1983).] AMB **33** (1987) 109–117. (in Portuguese)

The records of 771 out of 1006 patients were studied from 1973 to 1983. The incidence varied from 31 to 53 per 100,000 inhabitants while the prevalence varied from 300 to 470 per 100,000 inhabitants; 7.1% of the cases were 14 years old or less at the time of diagnosis, while 75.1% were between the ages of 15 and 54. The disease prevailed in young people in productive age groups, with occupations suggesting low socio-economic level. Most of the patients were born in Uberlandia and had lived there for at least 10 years.

The city center and its neighboring districts presented the highest incidence. The detection of the cases was due to patient demand of medical care in 50.8% of the group, only 14.7% having been detected through contact vigilance. The probable origin of infections was the family group in 40.5% of the cases. An average of six contacts per patient was found. Of the 1101 contacts examined, the clinical situation was known in 38.3% and 21% of them already presented clinical forms of the disease; 61.4% of polarized forms and 37.5% of non-polarized forms were found.

The study led us to the conclusion that the high levels of incidence and prevalence presented by the endemic situation of leprosy in Uberlandia requires, besides early diagnosis and adequate treatment, an effective method of contact vigilance and thorough health assistance for the population. The decentralization of leprosy control by local health centers will certainly open the access to health assistance and cause an increase in the quality of the system. The need for an improvement of the population's living standards in general was also felt by the authors for an effective control of this disease.—Authors' English Abstract

Mishra, B., Ramu, G., Chauhan, V. S., Kushwaha, S. S. and Dwivedi, M. P. Leprosy deformities. II. As parameters to monitor the effectivity of leprosy control programme. Indian J. Lepr. **60** (1988) 260–266.

Leprosy deformities have been considered as the main reason for dehabilitation and social ostracism. Prevention of deformities is considered as one of the most important objectives of a leprosy control program. In present work based on deformity status, efforts have been made to evolve new parameters and their possible application in assessment of a leprosy control program.—Authors' Abstract

Nadkarni, N. J., Grugni, A., Kini, M. S. and Balakrishnan, M. Childhood leprosy in Bombay: a clinico-epidemiological study. Indian J. Lepr. **60** (1988) 173–188.

During the years 1976–1985, 2138 cases of leprosy were detected in children aged 0–14 years in the L and M wards of Greater Bombay. Out of these, records of 1084 patients were available for detailed analysis. These were mainly from the deprived sec-

tions of society. Most cases were detected through surveys, though in recent years there is an increasing trend for voluntary reporting. The relevant epidemiological and clinical findings are presented and compared with the data of other workers in this field.—Authors' Abstract

Sehgal, V. N. and Sehgal, S. Leprosy in young urban children. Int. J. Dermatol. **27** (1988) 112–114.

Prevalence among leprosy patients of children in the age group of 0–14 years was 3.8%, with 9 male preponderance. The children were largely immigrants from the endemic neighboring states of Uttar Pradesh and Bihar [India]. A borderline group formed the bulk of the patients. The disease had its onset between ages 5 and 9 in more than half the patients. There was a striking contrast between the age at onset and that of reporting. Usually, the lesions were multiple. Single lesions were, however, present on the exposed parts. Skin-slit smears were positive in borderline borderline (BB), borderline lepromatous (BL), and lepromatous lepromatous (LL) only. A good clinicopathologic correlation was apparent in most patients.—Authors' Abstract

Sun, X., *et al.* [Calculation of relapse rate in leprosy and its significance.] China Lepr. J. **4** (1988) 68–70. (in Chinese)

The authors recommend the calculation of the relapse rate of leprosy in accord with a life table, and report the result of calculating the rate among 7445 cured cases in Weifang City of Shandong Province, China, using this method. To calculate the relapse rate, the method of the life table can effectively utilize the samples, show the number of observed person-years and the trend of relapse in the period of observation, and reckon the variance so as to make a comparison between two relapse rates from different groups using the normal approximation. The method of making the calculation with the fx-180p model calculator is presented.—Authors' English Abstract

West, B. C., Todd, J. R., Lary, C. H., Blake, L. A., Fowler, M. E. R. and King, J. W. Leprosy in six isolated residents of northern Louisiana (U.S.A.). Arch. Intern. Med. **148** (1988) 1987–1992.

Northern Louisiana has been essentially free of indigenous leprosy, and now it is not. Six new cases of leprosy have been diagnosed: three in 1986, the other three in 1985, 1983, and 1982, respectively. The patients had been lifelong residents of six scattered rural parishes. Leprosy had never been reported from five of them. No patient had had contact with human leprosy. The patients were white; four were women; the mean ± S.D. age at onset was 60.3 ± 16.4 years (age range, 31 to 80 years); and the mean ± S.D. interval to diagnosis was 1.2 ± 1.4 years. One patient had Hodgkin's disease at the age of 25 years and leprosy at the age of 31 years; another patient had cervical carcinoma. All rural northern Louisiana residents coexist with armadillos (*Dasypus novemcinctus*), some of which are infected with *Mycobacterium leprae,* the significance of which is unknown. Hypothetically, exposure to an unknown human case, reactivation of "asymptomatic" leprosy through immunosenescence or immunosuppression, or infection from an environmental source might have occurred. Because the patients lacked contact, travel, residence, and exposure risk factors, the origin of leprosy in the new indigenous cases is noteworthy and is not understood.—Authors' Abstract

Rehabilitation

Dorairaj, A., Reddy, R. and Jesudasan, K. An evaluation of the Semmes-Weinstein 6.10 monofilament as compared with 6 nylon in leprosy patients. Indian J. Lepr. **60** (1988) 413–417.

In a previous study Birke and Sims identified the 5.07 (10 y) Semmes-Weinstein monofilament as the most useful tool in measuring protective sensation in the sole of the foot of leprosy patients. This study

has demonstrated that the standard 6 nylon being used in Karigiri is as good as the monofilament in assessing protective sensation in leprosy patients. However there is a need for standardizing procedures for measuring sensory loss in leprosy patients.—Authors' Abstract

Mumford, J. W. and Mumford, S. P. Occlusive hydrocolloid dressings applied to chronic neuropathic ulcers. A study of efficacy in patients in a rural south Indian hospital. Int. J. Dermatol. **27** (1988) 190–192.

The response of 47 chronic ulcers (41 neuropathic [leprosy], 3 stasis, 1 traumatic, and 2 of unknown etiology) to hydrocolloid occlusive dressings was evaluated at a rural south Indian hospital. The response to treatment was objectively evaluated by photographic estimation of the surface areas of the ulcers. Eight ulcers healed over the 2 months of the study, and all but one ulcer improved. This type of dressing may have a valuable role in the management of chronic ulcers in the tropics, particularly those due to leprosy.—Authors' Abstract

Redondo, A., Nores, J. M., Vernery, C. and Gentilini, M. [Five cases of recurring leprous neuritis; surgical treatment.] Med. Malad. Infect. **6/7** (1988) 331–333. (in French)

Five cases of recurring leprous neuritis, which have been operated on twice, are reported. Pain and sensory-motor deficiency were the essential neurological signs which led to surgery. The operation consisted of transposition and/or interfascicular neurolysis. After the first operation, pain disappeared and the sensory-motor handicap was partially improved. Recurrence appeared within 3 to 7 years. If pain disappeared again after the second operation, it had no beneficial effect on the sensory-motor signs. Because of the good analgesic effect of surgery in recurring leprous neuritis, the authors conclude that surgical treatment should be proposed. They also underline the fact that recurrence is mostly due to the withdrawal of medical treatment.—Authors' English Summary

Zhang, J. [Survey of deformity and disability in leprosy.] China Lepr. J. **4** (1988) 71–72. (in Chinese)

The survey of 2263 cured and active leprosy patients in 1986 in Jingzhou Prefecture of Hubei Province, China, showed that 1304 (57.62%) have some deformity and disability. The deformity and disability are not related to the sex of the patients and are seen especially in those aged over 40 (54.8%) and in multibacillary cases. In the earlier stage of the disease, the deformities and disabilities are more often seen in paucibacillary patients. Deformity of the hand is present in 45.7% of the patients and of the foot in 33.5%. The manifestations most commonly seen are claw hand, monkey paw, drop foot, plantar ulcer, madarosis, lagophthalmos, etc.—Author's English Abstract

Zhao, X. [Investigation of deformity and disability in leprosy.] China Lepr. J. **4** (1988) 73–75. (in Chinese)

Five-hundred-forty-five patients in leprosaria were examined, 187 of which presented various deformities and disabilities, making up 34.41%. Among those who have deformity and disability, the proportion of the men to the women is 3.6 to 1.0; most (72.7%) of them were young or middle aged. In those who began treatment 5 to 9 years after the onset of the disease the rate of deformity is 40.1%. The deformity mostly is expressed as madarosis (46%) and Grade II disability, accounting for 38.2%. The occurrence of leprous deformity is closely related to failing to make early diagnosis and to resultant delay in treatment.—Author's English Abstract

Other Mycobacterial Diseases and Related Entities

Lindholm-Levy, P. J. and Heifets, L. B. Clofazimine and other rimino-compounds: minimal inhibitory and minimal bactericidal concentrations at different pHs for *Mycobacterium avium* complex. Tubercle **69** (1988) 179–186.

Clofazimine (Lamprene, B663) and 11 rimino-compounds were tested for activity against *Mycobacterium avium* by finding the minimal inhibitory concentrations (MIC) of these drugs in liquid medium. The activity of these compounds was affected in acidic conditions (pH 6.0 and 5.0), but the MICs observed even at pH 5.0 were significantly lower than the concentrations achievable in macrophages. This information is especially useful in light of four important facts: that these drugs tend to accumulate within macrophages; that *M. avium* tends to multiply within macrophages; that this intracellular environment has a low pH; and that *M. avium* tolerates these low pH conditions. Such data confirm the expectation that rimino-compounds inhibit the intracellular *M. avium* bacterial population. The minimal bactericidal concentrations of clofazimine and B746, the most active analog, were from 64 to 256 times higher than the MIC, but it is not clear whether these drugs can accumulate within the macrophages in concentrations high enough to produce the bactericidal effect as well.—Authors' Summary

Maurice, P. D. L., Bunker, C., Giles, F., Goldstone, A. and Holton, J. *Mycobacterium avium-intracellulare* infection associated with hairy-cell leukemia. Arch. Dermatol. **124** (1988) 1545–1549.

A 66-year-old man with hairy-cell leukemia was treated successfully with interferon alfa, with normalization of his hematologic parameters. After 2.5 months he became ill again and, following extensive investigation, *Mycobacterium avium-intracellulare* grew from a bone-marrow specimen. Although initiation of quadruple antituberculous chemotherapy resulted in an improvement of his general condition, after 2 months he started to develop widespread cutaneous and subcutaneous nodules, biopsy of which showed appearances compatible with mycobacterial infection. Over the next 2 months the skin lesions progressed slowly so erythromycin, to which *in vitro* testing showed the organism to be sensitive, was added to his therapy. This resulted in a marked improvement of all skin lesions. This case is the first to be reported of disseminated atypical mycobacterial infection in a patient receiving interferon treatment for hairy-cell leukemia.—Authors' Abstract

McFadden, J. J., Butcher, P. D., Thompson, J., Chiodini, R. and Hermon-Taylor, J. The use of DNA probes identifying restriction-fragment-length polymorphisms to examine the *Mycobacterium avium* complex. Mol. Microbiol. **1** (1987) 283–291.

DNA probes were used to identify restriction-fragment-length polymorphisms (RFLPs) in DNA samples, demonstrating that the *Mycobacterium avium* complex could be clearly divided into *M. avium* and *M. intracellulare* strains. Less than 2% DNA base substitution was found between *M. avium* strains; whereas the *M. intracellulare* strains had greater than 15% base substitution. The Johne's disease bacillus, *M. paratuberculosis* (American type strain), was found to be distinguishable from the *M. avium* complex serotypes examined. Strain 18 was found to be identical to *M. avium.* The rat leprosy bacillus, *M. lepraemurium,* was found to be very closely related, but not identical, to *M. avium.*—Authors' Summary

Morris, C. D. W. and Nell, H. Epidemic of pulmonary tuberculosis in geriatric homes. S. Afr. Med. J. **74** (1988) 117–120.

The prevalence of pulmonary tuberculosis in 809 residents of 11 old-age homes for whites and 1 for coloreds in East London, CP, was investigated in a cross-sectional study. A Mantoux test, chest radiography, an enzyme-linked immunosorbent assay (ELISA) and sputum culture were used.

The diagnosis was made on sputum culture in 12 subjects.The Mantoux test was positive in 7 of these subjects, and in 25% of the population. The ELISA on adsorbed sonicated mycobacterial antigen had a positive predictive value of 13% and probably has no diagnostic value for tubercular disease in this population. Of the subjects with a positive diagnosis 1 had a normal chest radiograph, 10 had minimal basal inflammatory infiltrates or patchy fibrotic changes, and 1 had evidence of classic reactivation of old apical lesions.

The national incidence of tuberculosis in the low-risk white population is 16/100,000. In old-age homes for whites, however, the overall case rate was 798/100,000 (a 50-fold increase), and in one home where there was a cluster of cases, it was 6849/100,000. In the home for coloreds the prevalence was 10, 344/100,000. This confirms other studies showing that elderly people living in old-age homes are at particular risk of developing tuberculosis. Males appear to be at higher risk than females. Recommendations regarding the diagnosis and control of tuberculosis in the elderly institutions and in old-age homes are made.—Authors' Summary

Mshana, R. N., Hastings, R. C. and Krahenbuhl, J. L. Infection with live mycobacteria inhibits *in vitro* detection of Ia antigen on macrophages. Immunobiology **177** (1988) 40–54.

Both antigen-specific and nonspecific anergy are common features of disseminated mycobacterial infections, and the pathogenesis of such anergy is as yet not fully understood. To date, most studies have focused on the efferent limb of the immune response, and no detailed information is available on the early macrophage-T-cell interaction and its consequence on T-cell clonal proliferation. To gain information on this crucial phase of mycobacteriosis, we have conducted studies to evaluate the effect of *Mycobacterium kansasii* infection on Ia expression induced by T-cell-derived lymphokine and have assessed whether such cells can adequately present either mycobacterial or allogeneic antigens to T cells.

In vitro infection of mouse resident peritoneal macrophages with live but not heat-killed *M. kansasii* resulted in a significantly reduced percentage of cells expressing monoclonal antibody detectable Ia antigen following optimal stimulation with crude lymphokine preparations or recombinant mouse gamma interferon. In parallel experiments, macrophages infected with the mycobacteria were co-cultured with syngeneic *in vivo M. kansasii* sensitized nonadherent, nylon-wool purified lymph node cells, and lymphoproliferation was measured by ^{3}[H]-thymidine incorporation. It was shown that in co-cultures with macrophages infected with live *M. kansasii,* the lymphocyte proliferation was marked even in very low infection ratios. In contrast, the response to heat-killed bacilli was dose dependent, reaching peak levels only in high infection ratios. The ability of infected macrophages to present allogeneic antigens was assessed using the mixed leukocyte reaction.Macrophages infected with heat-killed *M. kansasii* were able to induce a mixed leukocyte reaction similar to uninfected macrophages whereas macrophages infected with live *M. kansasii* were unable to stimulate allogeneic T cells.

These findings may have implications on immunological disturbances often seen in mycobacterial infections, such as leprosy, in which there can be large numbers of nontoxic viable intracellular bacilli.—Authors' Abstract

Saito, H., Sato, K. and Tomioka, H. Comparative *in vitro* and *in vivo* activity of rifabutin and rifampicin against *Mycobacterium avium* complex. Tubercle **69** (1988) 187–192.

In vitro antimicrobial activity of rifabutin and rifampin against various mycobacteria, including the *Mycobacterium avium* complex, was evaluated by the agar dilution method, using 7H10 agar medium. The activity of rifabutin based on MIC_{50} and MIC_{90} was higher than that of rifampin against all the acid-fast organisms tested. Microbicidal activity of rifabutin against the *M. avium* complex phagocytosed in mouse peritoneal or alveolar macrophages was greater than that of rifampin. Both rifabutin and rifampin had therapeutic effects against murine infections induced by *M. avium* complex. Rifabutin was somewhat more effective than rifampin in mice.—Authors' Summary

Schulzer, M., Enarson, D. A., Grzybowski, S., Hong, Y. P., Kim, S. J. and Lin, T. P. An analysis of pulmonary tuberculosis data in Taiwan and Korea. Int. J. Epidemiol. **16** (1987) 584–589.

An analysis is carried out on pulmonary tuberculosis survey data from Taiwan and Korea. A mathematical model based on a Markov process is developed and used to estimate transition rates between various disease states, as well as certain "infection parameters," which measure the strength of the relative contributions of different disease states and of endogenous reactivation to the incidence of tuberculosis in the population. It is found that endogenous reactivation plays a primary role in generating cases, followed by chronic sources of infection, particularly those with drug-sensitive organisms. Some recommendations are made with regard to optimizing treatment regimens. The methodology can easily be applied to other countries.—AS/S. E. Curtis (*From* Trop. Dis. Bull.)

Torgal-Garcia, J., David, H. L. and Papa, F. Preliminary evaluation of a *Mycobacterium tuberculosis* phenolglycolipid antigen in the serologic diagnosis of tuberculosis. Ann. Inst. Pasteur/Microbiol. **139** (1988) 289–294.

The presence of IgM specific antibodies against a recently described phenolic glycolipid antigen of *Mycobacterium tuberculosis* was studied with an ELISA in the serum of 162 people (40 tuberculosis patients and 122 healthy individuals). The results of the ELISAs were positive with 39 of the tuberculosis patients (97.5%) and 17 of the healthy individuals (13.9%). The sensitivity and the specificity of the tests were, respectively, 97.5% and 86.1%. These results indicate that the finding of IgM antibodies recognizing the phenolic glycolipid of *M. tuberculosis* may be useful for the presumptive diagnosis of active tuberculosis.—(*Translated from* Authors' French Summary)

Uttley, A. H. C. and Collins, C. H. *In vitro* activity of ciprofloxacin in combination with standard antituberculous drugs against *Mycobacterium tuberculosis.* Tubercle **69** (1988) 193–195.

Checker-board titrations show that the *in vitro* activity of ciprofloxacin against *Mycobacterium tuberculosis* is independent of that of streptomycin, isoniazid, ethambutol, and pyrazinamide, and confirm that there is antagonism between ciprofloxacin and rifampin.—Authors' Summary