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CURRENT LITERATURE

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

General and Historical

Binford, C. H., Meyers, W. M. and Walsh, G. P. Leprosy. JAMA **247** (1982) 2283–2292.

This is a succinct but comprehensive review of leprosy for physicians in the United States. The authors have clearly outlined those characteristics of the disease which are unique and different from other infectious diseases of man. They have reviewed the important developments in leprosy research over the past three decades as well as clearly outlining relevant aspects of the epidemiology, classification, therapy, transmission, animal models, immunology, and diagnosis and differential diagnosis.—RCH

Dorrington, L. Information sources for leprosy, with particular reference to developing countries. Lepr. Rev. **53** (1982) 105–114.

A brief description is given of the library and information sources available to developing countries, with particular reference to Latin America, Southeast Asia and Africa. The role of WHO in the on-going provision of literature services is reviewed. Four appendices deal with on-line service suppliers, directories of libraries and information services, a glossary of terms, and references to published work on libraries and information systems.—Author's Summary

Chemotherapy

Consigli, C. A. Saldo de las sulfonas. (Current status of the sulfones.) Leprologia **23** (1981) 5–8. (in Spanish)

The most salient characteristics of the action of sulfones in the treatment of leprosy are summarized, based on observations made over the last 40 years since the sulfones were introduced by Faget, *et al.* in 1941. Sulfones have many favorable characteristics, *e.g.*, efficacy in different clinical forms of the disease, the ability to render lepromatous cases bacteriologically negative, efficacy in chemoprophylaxis, low toxicity, and low cost which, taken together, permit a patient to be chemically isolated. Unfavorable characteristics of the sulfones include their slowness of action, leprosy reactions, persistence of bacteriologic positivity, the risks of recurrent disease when the sulfones are taken irregularly or intermittently, and the possibilities of sulfone resistance, both primary and secondary. Although not the ideal antileprosy drugs, sulfones are still the first line therapy in the disease, particularly for widespread or mass use.—(*Adapted from* the Author's Summary)

Feng, P. C. C., Fenselau, C. C. and Jacobson, R. R. Metabolism of clofazimine in leprosy patients. Drug Metab. Dispos. **9** (1981) 521–524.

We have identified two metabolites of clofazimine (B663; Lamprene; 3-(*p*-chloroanilino)-10-(*p*-chlorophenyl)-2,10-dihydro-2-isopropyliminophenazine) in our initial investigation of its metabolism in leprosy patients. Based on mass, ultraviolet, and visible spectrometry, we characterized an unconjugated (metabolite I,3-(*p*-hydroxyanilino)-10-(*p*-chlorophenyl)-2,10-dihydro-2-isopropyliminophenazine) and a conjugated (metabolite II, 3-(β-D-glucopyranosiduronic acid)-10-(*p*-chlorophenyl)-2, 10-dihydro-

2-isopropyliminophenazine) metabolite from the urine of patients. Both metabolites were red in color, similar to clofazimine; however, both were considerably more polar than the parent drug. We suggest that metabolite I was formed by a hydrolytic dehalogenation reaction, and metabolite II by hydrolytic deamination followed by glucuronidation.—Authors' Summary

Gidoh, M. and Tsutsumi, S. On the immunodepressive effect of rifampicin (RFP) on cell-mediated immunity of guinea pigs, examined by rabbit red blood cell rosette formation method. Jap. J. Lepr. **50** (1981) 55–61.

The immunodepressive effect of rifampin (RFP) was examined by a method of rosette formation between guinea pig lymphocytes (GPL) and rabbit red blood cells (RRBC). The oral dose of 30 mg/kg of RFP once every day for 12 days brought a serious immunodepression to the guinea pigs whose CMI was recovered during the term of above two months after thymectomy (named recovered guinea pigs); whereas it could not be detected in the guinea pigs whose CMI was still depressed due to the insufficient term after thymectomy (named immunodepressed ones). However, the depressive effect by the dose of 10 mg/kg of RFP could not be detected. On the other hand, the influence by the dose of 30 mg/kg of sulfadimethoxine (SD) could not be detected either by the use of recovered guinea pigs or by immunodepressed ones. Since the dosage of DDS (20 mg/kg) examined in a preceding report about its immunodepressive effect on normal and recovered guinea pigs was too high to consider the effect on patients under DDS therapy, the influence of 5 mg/kg of DDS on recovered guinea pigs was examined. However, in spite of positive result by Ghei, *et al.* (who noticed the immunodepression in volunteers by lymphocyte transformation method) the influence of DDS at the dosage of 5 mg/kg could not be clearly noticed by this method. Along with these results, the discussions made reference to the usage of this method, the attention to RFP and DDS therapies and the difference between DDS and SD.—Authors' Summary

Gatner, E. M. S., Anderson, R., Van Rensburg, C. E. and Imkamp, F. M. J. H. The *in vitro* and *in vivo* effects of clofazimine on the motility of neutrophils and transformation of lymphocytes from normal individuals. Lepr. Rev. **53** (1982) 85–90.

The effects of clofazimine on neutrophil motility to endotoxin-activated serum and mitogen-induced lymphocyte transformation of leukocytes from normal individuals *in vitro*, and after ingestion of clofazimine by normal adult volunteers have been assessed. Clofazimine caused a progressive dose-dependent inhibition of neutrophil motility and of lymphocyte transformation *in vitro*. Ingestion of the drug by normal volunteers was accompanied by decreased neutrophil motility and lymphocyte transformation to mitogens. These findings suggest that the anti-inflammatory properties of clofazimine are related to inhibition of these cellular immune functions.—Authors' Summary

Kim D. DDS-resistant leprosy in Korea. Scientia Lepro **4** (1981) 1–13. (in Korean)

There were 28,000 registered leprosy patients (17,000 lepromatous and 11,000 nonlepromatous) in Korea. Relapse of the disease in lepromatous patients under dapsone (DDS) treatment is becoming a more common finding throughout the country but no accurate figures are available to analyze the extent of the problem. However, it may be estimated that there are 1500 to 2000 relapse cases among the country's 17,000 lepromatous patients. With the mouse foot pad test done at Hiroshima University since 1979, the presence of the primary and secondary DDS-resistant cases was for the first time proven in Korea recently. Among 6 previously untreated lepromatous patients, 3 were DDS sensitive and 3 were DDS resistant. Of 10 lepromatous relapse cases, 1 was DDS sensitive and 9 were DDS resistant (3 high, 4 moderate and 2 low levels of DDS resistance). Therefore, it is known that the appearance of DDS-resistant *Mycobacterium leprae* has brought a serious problem in leprosy control in Korea.—(*Adapted from* Author's Summary)

Miyachi, Y. and Ozaki, M. Thalidomide does not affect polymorphonuclear leukocyte (PMN) chemotaxis. Jap. J. Lepr. **50** (1981) 62–64. (in Japanese)

Effects of thalidomide on PMN chemotactic activity were investigated in guinea pigs. Thalidomide, 12.5 and 25 mg/kg, was injected intraperitoneally for two days, and *in vitro* chemotaxis of cardiac blood PMNs to LPS-treated serum and casein sodium was evaluated using Boyden chamber techniques. Thalidomide revealed no significant suppression of locomotion of PMNs.

It is suggested that the effect of thalidomide on erythema nodosum leprosum, an Arthus type reaction, is not caused by the reduced PMN chemotaxis in the peripheral blood.—Authors' Summary

Modderman, E. S. M., Huikeshoven, H., Zuidema, J., Leiker, D. L. and Merkus, F. W. H. M. Intramuscular injection of dapsone in therapy for leprosy: A new approach. Int. Z. Klin. Pharmakol. Ther. Toxikol. **20** (1982) 51–56.

Dapsone is the drug of first choice in the treatment of leprosy. Although the oral route of administration has been mostly used, recent studies of patient compliance revealed that only about 50% of the tablets received by the patients are actually taken. It is generally assumed that irregular self-medication favors the development of dapsone resistance. The need for a more reliable route of administration led us to investigate the possibility of an i.m. dapsone depot injection. To achieve effective blood levels for three to four weeks, suspensions of large dapsone particles in an aqueous vehicle were made. In a trial with 20 leprosy patients in Nigeria, injection of 900 mg dapsone i.m. as a mixture of particle sizes <90 μm (20%) and 90-125 μm (80%) resulted in a serum level above 0.5 μg/ml for 18 $\pm$ 5 days with a mean peak concentration of 3.1 $\pm$ 0.9 μg/ml (n = 10). Injection of 1200 mg of the same particle-size mixture led to peak concentrations of 2.7 $\pm$ 1.0 μg/ml and maintenance of the level above 0.5 μg/ml for 25 $\pm$ 3 days (n = 5). After injection of 1200 mg (particle size <90 μm), serum levels were kept above 0.5 μg/ml for 21 $\pm$ 5 days with a maximum concentration of 3.9 $\pm$ 1.2 μg/ml (n = 5). Serum levels were measured using a rapid non-extractive HPLC method. The injections were very well tolerated. Due to these encouraging results, the dosage and formulation will be further optimized.—Authors' Summary

Nerurkar, C. B., Chaudhari, D. T., Patel, M. R. and Sabnis, S. S. Synthesis and study of thiocarbanilides derived from 2-(4′-aminophenyl) thiazoles and 4-(4′-aminophenyl) thiazoles for *in vitro* antituberculosis activity. Bull. Haffkine Inst. **8** (1980) 27–32.

New thiocarbanilides from 2-(4′-aminophenyl) thiazoles and 4-(4′-aminophenyl) thiazoles have been prepared and tested for *in vitro* antituberculosis activity. A number of these compounds displayed fairly significant activity and four thiocarbanilides were found to be as active as para aminosalicylic acid (PAS) and ethionamide in *in vitro* testing—(*From* Trop. Dis. Bull.)

Pattyn, S. R., Portaels, F., Van Loo, G. and Van den Breen, L. Activity of the combination of isoniazid, prothionamide and dapsone against *Mycobacterium leprae* and some other mycobacteria. Arzneim. Frosch. **31** (1981) 2155–2157. (in German)

No additive effect was found with the addition of isoniazid to either dapsone or prothionamide against *Mycobacterium leprae* and against highly dapsone-sensitive *in vitro* growing *M. sp.* strains. It is concluded that the indication for the administration of isoniazid in leprosy is extremely limited and could only be envisaged as a companion drug in combined therapy of dapsone-resistant multibacillary leprosy in light-skinned people, when aminoglycosides cannot be administered.—Authors' Summary.

Pendalwar, S. L., Chaudhari, D. T. and Patel, M. R. Synthesis and study of 2-aryloxy thioisonicotinamides analogous to ethionamide and thiazoles derived therefrom as antituberculosis agents. Bull. Haffkine Inst. **8** (1980) 33–40.

A few new 2-aryloxy thioisonicotinamides analogous to ethionamide and various thiazoles derived therefrom were prepared and studied for their antituberculosis activity. Out of eight thioamides, a majority exhibited activities better than that of thioisonicotinamide, although less than ethionamide. Out of 31 thiazoles prepared, one exhibited an activity twice that of thioacetazone, while 4-(4′-aminophenyl) thiazoles as a class possessed activity better or equivalent to that of thioacetazone under identical conditions of *in vitro* testing.—(*From* Trop. Dis. Bull.)

Clinical Sciences

Bharadwaj, V. P., Ramu, G. and Desikan, K. V. Fluorescent leprosy antibody absorption (FLA-ABS) test for early serodiagnosis of leprosy. Lepr. India **53** (1981) 518–524.

The conventional parameters for the diagnosis of leprosy, *i.e.*, clinical symptoms aided by smear and histological examinations, have certain limitations. With the conventional parameters, it is difficult to diagnose new cases in the early stage of leprosy. Recently Abe, *et al.* (1976) and Abe and Yoshino (1978) suggested that the fluorescent leprosy antibody absorption (FLA-ABS) test developed by one of the authors (Abe) might be useful for early serodiagnosis of leprosy. Following this, the FLA-ABS test was standardized at the Central Jalma Institute for Leprosy, Agra, to study the usefulness of the test in early serodiagnosis and detection of subclinical infections.

In the present study, sera were collected from 136 cases of different types of leprosy which included 11 cases with lesions suspected to be leprosy, 58 healthy contacts, and 19 healthy controls. Using the FLA-ABS test, anti-*Mycobacterium leprae* antibodies were detected in all types of leprosy irrespective of the type and duration of the disease. The test has shown significantly high positive results in very early cases of leprosy with a duration of three to six months and having very small lesions measuring below 2 cm.—Authors' Summary.

Cardama, J. E., Gatti, J. C., Olivares, L. M., Pizzariello, G. and Comerci. N. N. Lepra y tumores cutaneos malignos. (Leprosy and malignant skin tumors.) Leprologia **23** (1981) 13–18. (in Spanish)

Nine cases of malignant tumors of the skin in leprosy patients are reported between the years 1971 and 1980. A review of the literature on this association is presented. The co-existence of leprosy and skin cancer is not extremely rare. Skin cancer appears to have a similar frequency in leprosy patients as in a normal population.—(*Adapted from* the Authors' Summary)

Castro-Coto, A. and Hidalgo-Hidalgo, H. Lepra lepromatosa difusa en Costa Rica. (Diffuse lepromatous leprosy in Costa Rica). Dermatologia Rev. Mex. **25** (1981) 261–269. (in Spanish)

From 1975 to 1979 in Costa Rica, 165 new cases of leprosy have been reported and among them 55 (33%) were classified as diffuse lepromatous leprosy. This clinical variety is therefore the most frequent in this country, and the so-called pure and primitive cases are the most abundant ones. Males are slightly more affected (1.5:1). Age distribution is very similar to other cases but in the age group 0–14 years cases are less numerous.

Lucio's phenomenon during reactional stages is less frequent than erythema nodosum leprosum (ENL) and, as other authors have observed, it is mainly seen in pure and primitive cases. In patients who are under treatment, the change to ENL has been confirmed.—(*Adapted from* the Authors' Summary)

Charosky, C. B. Compromiso osteo-articular en la reaccion leprosa. (Osteo-articular changes in the lepra reaction.) Leprologia **23** (1981) 47–52. (in Spanish)

The author reviews the characteristics of subcutaneous tissues, muscles, joints, and

bones as they are affected by episodes of reaction in leprosy. The pathophysiology, differential diagnosis, and applicable therapies are considered.—(*Adapted from* the Author's Summary)

Compa, F. V., Cabrini, J. M., Arpini, R. H., Recarte, M. C., Vacirca, E. E. and Chapo, R. Lepra de Lucio. (Lucio's leprosy.) Leprologia **23** (1981) 53–56. (in Spanish)

The authors briefly review the history of Lucio's leprosy, a special form of lepromatous leprosy caused by a total anergy of the host to *Mycobacterium leprae*. They point out one phase of the disease in the beginning, another infiltrative state, and a final state of the disease in which there is a non-infiltrative generalization with ichthyosis. Histologically, there is an absence of epidermal atrophy. In puberty the prognosis is severe, and the disease can be fatal.—(*Adapted from* the Authors' Summary)

Compa, F. V., Cabrini, J. M., Arpini, R. H., Vacirca, E. E., Recarte, M. C. and Chapo, R. Fenomeno de Lucio. (The Lucio phenomenon.) Leprologia **23** (1981) 57–59. (in Spanish)

The authors describe the Lucio phenomenon, a vasculitis produced by deposits of immune complexes which would appear to be analogous to the Arthus phenomenon. They describe the distinct forms of the condition at the beginning, its clinical evolution, the localization of the process, and the unique histopathology.—(*Adapted from* the Authors' Summary)

Dubey, G. K., Joglekar, V. K., Grover, S. and Chaubey, B. S. Correlation of clinical and histopathological studies in classification of leprosy. Lepr. India **53** (1981) 562–565.

This paper presents a study of 100 cases of leprosy of different clinical types. These 100 cases included 26 TT, 3 BT, 7 BB, 2 BL, and 62 LL. All were subjected to skin biopsies and were classified on the basis of histopathological changes. It was observed that there was some disagreement in clinical and histopathological classficiation. Thus, histopathologically there were 20 TT, 9 BT, 7 BB, 6 BL, and 58 LL.

It appears that skin biopsy may be studied in all cases of leprosy. A combination of clinical features and histological changes in the skin biopsy may help in better classification of leprosy.—Authors' Summary

Dutta, R. K. and Murthy, N. A study of hypo-pigmented lesions in children. Lepr. India **53** (1981) 634–640.

One hundred fifty children between two and ten years of age that reported to Command Hospital Air Force, Bangalore, with hypopigmented patches during January 1979 to December 1979 were studied. Two percent of these children were diagnosed as having indeterminate leprosy, 36% as pityriasis alba, 14.8% as pityriasis versicolor, 4% as tinea corporis, 6.6% as atopic dermatitis, and 2% as vitiligo. Fifty-two (34.6%) remained undiagnosed. These undiagnosed patients were taken as subjects for a study of the effects of dapsone on these lesions. After a period of one year of dapsone, 12 of 25 patients treated with dapsone had improvement in their lesions. Ten completely cleared, and in three there was no change. In the control group which did not receive dapsone, 6 of 24 showed improvement in the lesions, 3 completely cleared, and 10 showed no change. Indeterminate leprosy was diagnosed in three cases of the control group on the basis of progression of the lesions, diminished superficial sensation, regional thickened nerves, and infiltration along dermal nerves. Children with undiagnosed hypopigmented lesions having a family history of leprosy or coming from a highly endemic area for leprosy are considered to be at a high risk for developing the disease.—(*Adapted from* the article)

Espana, A. Neuopatias reaccionales Hansesianas. (Neuropathic reactions in leprosy.) Leprologia **23** (1981) 37–40. (in Spanish)

The author describes reactional neuropathies in leprosy and their different manifestations according to the clinical form of the disease. The neural compression syndrome, either extrinsic or intrinsic, can lead to different degress of "neural interruption

syndrome,'' reversible neuropraxia, or neuronopnesis, and is irreversible without early intervention. Applicable therapeutic possibilities are outlined and the approaches to diagnosis and localization of the syndrome are described.—(*Adapted from* the Author's Summary)

Fankule, Y. M. and Whittle, H. C. Hepatitis-B virus infection in patients with leprosy: A serological study in a leprosarium in Northern Nigeria. Trans. R. Soc. Trop. Med. Hyg. **75** (1981) 623–625.

The prevalence rates of hepatitis-B surface antigen (HBsAg) and its homologous antibody (anti-HBs) were determined in 62 patients in a leprosarium (42 tuberculoid and 20 lepromatous) and in 40 adults living near the locality. The exposure rate (HBsAg + anti-HBs) was high in both controls and patients, 72.5% and 70.9%, respectively. The frequency of HBsAg was significantly higher in patients with lepromatous leprosy (40%) compared with controls (10%) ($\chi^2 = 5.7$, $p < 0.025$) but there was no difference in the prevalence rate of HBsAg between patients with lepromatous leprosy (40%) compared with those with tuberculoid leprosy (23.8%) ($\chi^2 = 1.7$, $p > 0.1$). The exposure rate was higher in the lepromatous group (80%) compared with the tuberculoid group (59.5%) but the difference was not significant ($\chi^2 = 2.87$, $p > 0.05$). It is concluded that the high rate of infection in patients with leprosy is not due to a peculiar genetic defect but the result of living in an environment where the virus is highly endemic. The observed significant increase in carriage of HBsAg in lepromatous leprosy is probably due to depressed cellular immune function characteristic of this group of patients. The slightly increased exposure rate to HBV of lepromatous versus the tuberculoid type of leprosy is probably due to increased opportunity for infections from repeated and prolonged stays in the hospital.—(*From* Trop. Dis. Bull.)

Fekete, E., Sarojini, P. A. and Mock, B. Borderline-tuberculoid leprosy in reaction presenting as photodermatitis: A case report. Lepr. Rev. **53** (1982) 115–117.

A 30-year-old female patient with BT leprosy in reaction presented as a case of photodermatitis. The diagnosis was confirmed by the skin biopsy and demonstration of acid-fast bacilli in the biopsy section.—Authors' Summary

Ferlazzo, B., Barrile, A., Puglisi, A., and Tigano, F. Marcatori sierici dell'infezione da virus del-epatite ''A'' (anti-HAV) e ''B'' (HB_sAg-HB_sAb, HB_eAg-HB_eAb) nei lebbrosi. [The hepatitis A and B virus markers (anti-HAV, HB_sAg, HB_sAb, HB_sAb, HB_eAg, HB_eAb) in leprous patients.] Ann. Sclavo **22** (1980) 355–362. (in Italian)

The hepatitis A and B virus markers (anti-HAV, HB_sAg, HB_sAb, HB_eAg, HB_eAb) were studied in the serum of 25 patients at the leprosy hospital of Messina, Italy.

Anti-HAV were detected, by RIA, in 100% of the patients; by the same method HB_sAg was found in 12%, and HB_sAb was found in 4% of the cases.

In no patient HB,Ag was detected by immunodiffusion; on the contrary, Hb,Ab was found in 4% of the cases.

No significant difference between lepromatous and tuberculoid leprosy was found.—Authors' Summary

Hidalgo-Hidalgo, H. and Castro-Coto, A. Lepra tuberculoide nodular en Costa Rica. (Nodular tuberculoid leprosy in Costa Rica.) Dermatologia Revista Mexicana **25** (1981) 316–324. (in Spanish)

Nodular tuberculoid leprosy (Souza Campos) in Costa Rica has been reviewed. First reports were made in 1976 and at present 55 patients are known. They constitute a focus in several suburbs of the town of Liberia. They are distributed in 15 families with an average of 3.67 by group.

These cases are seen mainly in males (63.64%) and the relationship is of 1.75 males to 1 female. Age was variable, the youngest 18 months old, and the oldest 58 years old. Cases were more frequent before 15 years, but a number of cases were seen in adults. This is interesting because their clinical form was originally described in children.

These 55 patients had 154 lesions (2.8 median) on the face, upper limbs, trunk, lower limbs and neck.—Authors' Summary

Kim, Y. A study on selection of sites for acid-fast bacilli in skin smears of leprosy patients. Kor. Lepr. Bull. **14** (1981) 1–6. (in Korean)

The bacteriological status of leprosy patients is usually assessed by the slit-skin smear method introduced by Wade (1963). The Bacteriologic Index (BI) was calculated by this method taken from both eyebrows, both ear lobes, the chin, both legs, the dorsal surfaces of the middle and terminal phalanges of the middle finger of both hands, the dorsal surfaces of the middle and terminal phalanges of the second toe of both feet, and the nasal mucosa in 39 lepromatous leprosy patients who have been treated with antileprosy chemotherapy regularly or irregularly. The bacterial indices from the 16 sites were compared:

a) In two long-treated smear negative cases, the terminal phalanges of the fingers proved to be the only skin sites positive for bacilli, all other routine sites being acid-fast bacilli negative.

b) The individual mean values of BI of the dorsum of the middle and terminal phalanges of the middle finger of both hands and those of the dorsum of the middle and terminal phalanges of the second toe of both feet were not significantly different.

c) In 35 out of 39 cases, the BI at the finger was more productive than that at the nasal mucosa. In 26 out of 39 cases, the BI at the toe was more productive than that at the nasal mucosa, *i.e.*, the BI at the finger and the toe were not less than that at the nasal mucosa.

d) The mean value of BI of the 9 sites was 2.73 in the eyebrow, 2.66 in the ear lobe, 2.62 in the lower leg, 2.48 in the chin and the dorsal surfaces of the terminal phalanges of the middle finger of both hands, 2.43 in the dorsal surfaces of the middle phalanges of the middle finger of both hands, 2.38 in the dorsal surfaces of the terminal phalanges of the second toe of both feet, and 2.17 in the dorsal surface of the middle phalanges of the second toe of both feet.

We thought that it was very reasonable to include the middle finger and the second toe as routine sites for slit-skin smear for *Mycobacterium leprae* identification.—(*Adapted from* Author's Summary)

Malaviya, G. N. and Ramu, G. Loss of taste and somatic sensations over the tongue in leprous facial palsy—a case report. Lepr. India **53** (1981) 656–659.

A case of leprous facial paralysis with complete loss of taste and somatic sensations of the tongue on the paralyzed side of face is reported. The possible route of involvement of the glossopharyngeal nerve is discussed.—Authors' Summary

Ng, W. L., Scollard, D. M. and Hua, A. Glomerulonephritis in leprosy. Am. J. Clin. Pathol. **76** (1981) 321–329.

A renal biopsy from a patient with lepromatous leprosy but no history of erythema nodosum leprosum (ENL) showed histologic, immunofluorescent, and ultrastructural features typical of immune-complex glomerulonephritis. A literature review found reports of 187 renal biopsies from leprosy patients, with glomerulonephritis in 31% of the cases, and a variety of other renal lesions. This accumulated evidence demonstrates that, contrary to widely held opinion, there is no association between glomerulonephritis and a history of ENL. Furthermore, it suggests that glomerulonephritis in leprosy patients has a similar incidence in lepromatous and nonlepromatous cases. These observations have an important bearing on concepts regarding the pathogenesis of immune complex glomerulonephritis in leprosy and the humoral immune mechanisms in patients with leprosy.—(*From* Trop. Dis. Bull.)

Ortiz, M. C. Manifestaciones viscerales de la leproreaccion. (Visceral manifestations of lepra reactions.) Leprologia **23** (1981) 31–35. (in Spanish)

The author has classified visceral manifestations of lepra reactions as being of two types: a) without apparent localization and with either clinical or subclinical manifestations, and b) with localization and manifested by involvement of ophthalmologic, otorhinolaryngologic, gastrointestinal, hepatosplenic, lymphatic, renal, adrenal, and orchido-epididymal involvement. The clinical and histopathological characteristics of each of these involvements, as reported by

different authors, are reviewed.—(*Adapted from* the Author's Summary)

Panayi, G. S. Does rheumatoid arthritis have a clinicopathological spectrum similar to that of leprosy? Ann. Rheum. Dis. **41** (1982) 102–103.

It is proposed that rheumatoid disease is a dynamic disease with a clinical and immunopathological spectrum, namely, 1) lepromatous rheumatoid: immune complex disease with extra-articular complications; 2) tuberculoid rheumatoid: cell-mediated immune disease with joint destruction. There are, of course, intermediate or borderline phases with features of both extremes being present, and patients may oscillate from one part of the spectrum to another.—(*Adapted from* the article)

Penchenier, L., Louvet, M., Gridel, F. and Therizol-Ferly, M. Étude paraclinique de l'onchocercose en population lépreuse et non lépreuse. (Paraclinical study of onchocerciasis in a leprous and nonleprous population.) Bull. Soc. Path. Ex. **74** (1981) 273–283. (in French)

This study concerns a total of 160 patients with leprosy (54 tuberculoid and 106 lepromatous) from a center in Mali which is endemic for both leprosy and onchocerciasis. The findings were compared with over 500 patients who did not have leprosy and who were attending the dermatology clinics. It was found that 43% of the leprosy patients also had onchocerciasis; whereas only 14% of the dermatological patients had onchocerciasis, and this latter figure is consistent with the overall finding in Mali. Although admitting the difficulties of accurately comparing groups of patients under the conditions of this study, the authors nevertheless consider that the above difference may point to a significant association between the two diseases, and they raise the possibility that leprosy may predispose to onchocerciasis, or vice versa. [This is a valuable contribution to a subject which has been insufficiently investigated; apart from the fact that many patients with cutaneous onchocerciasis (only) have been mis-diagnosed as having leprosy, the association of these two diseases has obvious importance in the sphere of epidemiology and immunology, and it merits further research.]—A. C. McDougall (*From* Trop. Dis. Bull.)

Rea, T. H. El fenomeno de Lucio y la lepra lepromatosa difusa pura y primitiva en un area no endemica de lepra. (The Lucio phenomenon and diffuse lepromatous leprosy pure and primitive, in a non-leprosy endemic area.) Dermatologia Revista Mexicana **25** (1981) 393–398. (in Spanish)

At the present state of the art the pathogenesis of both pure primitive diffuse lepromatous leprosy (PPDL) and Lucio's phenomenon is not known. Our experience in Los Angeles suggests that the proliferation of *Mycobacterium leprae* within endothelial cells, a phenomenon evidently common in lepromatous disease but specially well developed in the Lucio patient, may be of importance in the pathogenesis of both PPDL and Lucio's phenomenon. Furthermore, immune complexes may also have a role in the pathogenesis of Lucio's phenomenon, the presence of *M. leprae* within endothelial cells perhaps facilitating the presentation of antigen to antibody. The major importance of these ideas is that they provide hypotheses which can be subjected to testing. It is likely that these ideas will seem naive at the time of publication of the fiftieth anniversary issue of *Dermatologia Revista Mexicana*.—Author's Summary

Rossi Vargas, J. Lepra nasal. (Leprosy of the nose.) An. Otorrinolaringol. Ibero. Am. **8** (1981) 185–188. (in Spanish)

This is a case report of a woman with an unusual presentation of lepromatous leprosy consisting of a lesion in the left nasal vestibule of ten years' duration. There were no other lesions apparent. The diagnosis was made by smear.—(*Adapted from* Author's Summary)

Saha, K., Sharma, V. K., Sehgal, V. N. and Agarwal, S. K. Natural resistance against tetanus in patients with lepromatous leprosy. Trans. R. Soc. Trop. Med. Hyg. **75** (1981) 832–834.

Tetanus antitoxin levels in the sera of unimmunized lepromatous patients, often suf-

fering from many ulcerations on their limbs due to physical and thermal trauma, but not developing clinical tetanus, were studied. Sera from 40 such patients with no history of immunization against tetanus, 35 unimmunized matched controls, and 12 immunized controls were tested for the presence of tetanus antitoxin by the passive hemagglutination technique. Forty-five percent of patients, 17% of controls, and all the immunized patients showed adequate serum antibody levels. Eight of the 22 leprosy patients, with no detectable antitoxin in their sera, were immunized with a single dose of tetanus toxoid, and all showed sero-conversion four weeks later. 2-Mercaptoethanol (2ME) treatment of these sera showed both IgM and IgG classes of specific antibody in all groups, but the level of mature antibody of IgG class was higher in the immunized group. Neutralization tests further confirmed the presence of protective antibodies in these sera.—Authors' Summary

Singh, M., Kanwar, A. J. and Malhotra, Y. K. An unusual presentation of histoid leprosy. Garyounis Med. J. **4** (1981) 91–92.

A 21-year-old male patient was referred to the authors for treatment of molluscum contagiosum. Most of the lesions were umbilicated, skin-colored, semitransparent papules. Further examination revealed hypopigmented, hypoesthetic patches all over the body. The clinical diagnosis of histoid leprosy was confirmed by slit and smear examination from the ear and a lesion, which showed numerous acid-fast bacilli and histological changes were also consistent. Thickened radial, ulnar and lateral popliteal nerves were discovered.

The authors publish the case to stress that casual examination would have been insufficient and misleading and in addition they are not aware of such lesions being described before in histoid leprosy.—Ralph Schram (*From* Trop. Dis. Bull.)

Strobel, M., Arnold, J. and Husser, J. A. La forme maculaire indéterminée de la lèpre. (The macular indeterminate form of leprosy.) Dakar Medical **26** (1981) 105–111. (in French)

Concerning 49 suspicious cases of indeterminate leprosy observed in the dermatology clinic where this initial form of the disease appears much more frequently than elsewhere, the principal clinical, histological, and evolutive aspects are reviewed. The stress is placed on the value of the histopathological examination and on the problems of differential diagnosis. It confirms that indeterminate leprosy is, of all the forms of leprosy, the one for which the histoclinical concordance is the weakest and of which the diagnosis is one of the most difficult.—Authors' Summary

Vaquero, N. L. and Soto, I. Neurodositis del supraorbitario en lepra. (Compression neuritis of the supraorbital nerve in leprosy.) Leprologia **23** (1981) 41–45. (in Spanish)

Three cases of compression neuritis of the supraorbital nerve in leprosy are presented. The etiopathogenesis and clinical and therapeutic characteristics of the syndrome are described.—(*Adapted from* the Authors' Summary)

Venkatesan, K., Bharadwaj, V. P., Sritharan, V., Girdhar, B. K., Ramu, G. and Desikan, K. V. Serum protein bound fucose (PBF) in untreated leprosy patients. Lepr. India **53** (1981) 531–536.

Protein-bound fucose (PBF) content in sera from normal persons and untreated lepromatous or near-lepromatous leprosy patients was measured and statistically analyzed. Normal serum gave a mean value of 8.15 ± 2.7 mg% and the sera of leprosy patients gave a value of 13.3 ± 3.38 mg%. The fucose contents in the glycoprotein and mucoprotein fractions were determined and found to increase in untreated leprosy patients. Values for the ratio of fucose to protein also were found to be high in the sera of patients studied.—Authors' Summary

Verma, K. C., Ganguli, D. D., and Jain, V. K. Applicability of Ridley-Jopling scale in clinical practice. Lepr. India **53** (1981) 556–561.

Twenty-seven cases (90%) out of 30 cases studied could be graded clinically at exact points of the scale. Out of the remaining

three cases (10%), two cases (6.6%) required in-between points of the scale. Twenty cases (66.6%) out of the 30 cases studied histologically could be graded at exact points of the scale. Three cases (10%) required further histological subgrading.

Final clinico-histopathological clubbing was possible in 66.66% of the cases.

Disparity was observed at BT and BL points, and 100% parity was obtained at polar ends. Patients presenting with macular or early infiltrative lesions at BT and BL points showed an indeterminate histology.—Authors' Summary

Immuno-Pathology

Bahr, G. M., Modabber, F. Z., Rook, G. A. W., Mehrotra, M. L., Stanford, J. L. and Chedid, L. Absence of antibodies to muramyl dipeptide in patients with tuberculosis or leprosy. Clin. Exp. Immunol. **47** (1982) 53–58.

The enzyme-linked immunosorbent assay (ELISA) was used to detect the presence of antibodies to muramyl dipeptide (MDP) in the serum of patients with leprosy or tuberculosis. Using a conjugate of MDP-lysine to horseradish peroxidase, no such antibodies could be detected in sera of either patients or controls. Antibodies to a sonicate antigen of *Mycobacterium tuberculosis* were found in sera of all individuals tested and the binding of these antibodies to the *M. tuberculosis* antigen could not be inhibited by MDP. On the other hand, binding of MDP to anti-MDP antibodies, raised in rabbits, was largely inhibited by free MDP, slightly inhibited by *M. tuberculosis* antigen, and was not inhibited by the patients' sera.—Authors' Summary

Chon, J. Y., Kim, Y. S., Chun, I. K. and Kim, Y. P. A study of adenosine deaminase activity in the serum of leprous patients. Kor. Lepr. Bull. **14** (1981) 21–25. (in Korean)

The immune function of lepromatous leprosy against *Mycobacterium leprae* is identified to be depressed in contrast to that of tuberculoid leprosy by many techniques.

In this paper, we report the results of a study in which the state of immune activity was investigated indirectly by measuring the activity of adenosine deaminase (ADA), an enzyme which is known to be decreased in activity in immune deficiency diseases, in the serum of leprous patients.

There is no conspicuous difference in ADA activity between lepromatous and tuberculoid leprosy or between treated and untreated cases.—(*Adapted from* Authors' Summary)

Fliess, E. L., Ortiz, M. C. and Corn, J. Efecto *in vitro* de una suspension de *Mycobacterium leprae* sobre la fagocitosis y lisis de levaduras por polimorfonucleares neutrofilos (comunicacion previa). [The *in vitro* effects of a suspension of *Mycobacterium leprae* on the phagocytosis and lysis of candida by neutrophils (preliminary communication).] Leprologia **23** (1981) 61–64. (in Spanish)

The authors studied the influence of a suspension of *Mycobacterium leprae* from infected armadillos on the phagocytic and lytic function of neutrophils from patients with leprosy utilizing *Candida albicans* and *C. pseudotropicalis* as antigens. Thirteen lepromatous patients (7 quiescent and 6 reactional) and 5 healthy controls were studied. The results indicate that the neutrophils of the patients studied had a candidicidal activity similar to that of neutrophils from healthy individuals ($p > 0.2$). Simultaneous incubation with suspensions of *M. leprae* did not modify the phagocytic or lytic function of neutrophils from either the leprosy patients or from the healthy controls ($p > 0.2$).—(*Adapted from* the Authors' Summary)

Geniteau, M., Adam, C., Verroust, P., Pasticier, A., Saimot, G., Coulaud, J. P. and Languillon, L. Les complexes immuns et

le complément dans la lèpre. (Immune complexes and complement in leprosy.) Nouv. Presse Med. **10** (1981) 3697–3700. (in French)

The sera of 87 Senegalese patients with various forms of leprosy were investigated. Two of the most reliable methods were used to detect circulating immune complexes: the radiolabelled C1q binding test and the Raji cell binding technique. Several fractions of complement, including C3, C4, factor B and the C3d product of C3 were also assayed. A material having the properties of immune complexes was detected in lepromatous and reactional leprosy. In tuberculoid leprosy, only the Raji cell binding technique gave positive results. C3 and C4 were normal or slightly raised, but C3d was increased in all forms of the disease. There was no significant correlation between C3d values and the results of immune complexes detection tests.—Authors' Summary

Ghei, S. K., Sengupta, U., and Desikan, K. V. *In vitro* effect of DDS on phytohaemagglutinin (PHA)-induced lymphoctye transformation. Hansen. Int. **5** (1980) 112–118.

A study to find out the *in vitro* effect of diaminodiphenyl sulfone (DDS) on phytohemagglutinin (PHA)-induced lymphocyte transformation was carried out in three phases using a wide range of DDS concentrations. Lymphocytes from healthy volunteers were investigated. Volunteers were divided into three groups to conduct the study in three phases. In each phase in addition to 0.02 ml of PHA, four different concentrations of DDS were added per 10^6 lymphocytes in a tissue culture system.

A statistically significant depression ($p < 0.05$) in the percent of blast cell formation induced by PHA was observed in the cultures with all the concentrations of DDS except with the lowest concentration (0.01 μg) of DDS. While the depression observed in the first and the third phase was found to be dose dependent, no significant correlation was noted between the DDS concentration and depression in PHA induced blastogenesis in the second phase. The significance of these observations are discussed.—Authors' Summary

Gimenez, M. and Morini, J. C. Respuesto inmunologica cutanea especifica en hijos de enfermos de lepra incaracteristica, tuberculoide y lepromatosa. (Specific skin test responses in children of patients with indeterminate leprosy, tuberculoid leprosy, and lepromatous leprosy.) Leprologia **23** (1981) 9–12. (in Spanish)

The authors studied skin test responses in healthy children of patients with indeterminate leprosy, tuberculoid leprosy, and lepromatous leprosy. The skin test antigens were bacillary lepromin of human origin at three concentrations and tuberculin (PPD). The skin test responses were read at 48 hr and at 21 days for lepromin and at 48 hr for PPD. The responses of the children of patients with lepromatous leprosy and indeterminate leprosy were positive in a higher percentage of cases. In contrast, the children of patients with tuberculoid leprosy showed a greater percentage of negative responses. The authors attribute this to the infrequent contact with bacterial antigens in the children of tuberculoid patients.—(*Adapted from* the Authors' Summary)

Jagannath, C. and Sengupta, D. N. Serology of leprosy. I. Indirect hemagglutination test with stabilized sensitized red cells. Lepr. India **53** (1981) 507–512.

An indirect hemagglutination (IHA) test has been described for the qualitative and quantitative detection of antibodies specific to *Mycobacterium leprae*. Aldehyde stabilized red cells were sensitized with a sonicate antigen prepared from *M. leprae* purified from armadillo liver. These cells were titrated against sera from patients with different types of leprosy, their healthy household contacts, and patients with tuberculosis. Specific antibodies were demonstrated in leprous sera by IHA test after absorption of sera with *M. tuberculosis* and *M. vaccae*. All advanced forms of leprosy (LL and BL) and a variable number of other forms of leprosy (BB, BT and TT) showed a positive result with an IHA titer of 1 in 32 or above. None of the household contact sera nor sera from tuberculosis patients showed a positive IHA test. The application of the simple hemagglutination test in the immunoepidemiology of leprosy is discussed.—Authors' Summary

Jagannath, C. and Sengupta, D. N. Serology of leprosy. II. Demonstration of specific antibodies to *Mycobacterium leprae* by counter current electrophoresis. Lepr. India **53** (1981) 513–517.

A rapid and simple method for the demonstration of specific antibodies to *Mycobacterium leprae* using counter current electrophoresis (CCE) has been described. Three types of antigens (sonicate antigen, surface antigen and purified protoplasmic protein antigen) were prepared from purified *M. leprae* and tested against sera from patients with different types of leprosy, and their healthy household contacts, by CCE. Antibodies specific to *M. leprae* were demonstrated by CCE after absorption of sera with *M. tuberculosis* and *M. vaccae*. All advanced forms of leprosy (LL and BL) and a lesser number of other forms of leprosy (BB, BT and TT) showed specific antibodies reactive with the three types of soluble antigens from *M. leprae* and antibodies reactive with soluble antigens from *M. tuberculosis* and *M. vaccae*. The latter type of antibodies were, however, removed by prior absorption of sera with the respective mycobacteria. The applicability of the simple electrophoresis method in the serology of leprosy is discussed.—Authors' Summary

Kharatyan, A. M. and Kenzhebaev, A. Y. Radioisotope detection of the antitoxic function of the liver in patients with leprosy. Vesta. Dermatol. Venerol. **9** (1981) 47–50. (in Russian)

The antitoxic function of the liver was studied in 91 patients with different types of leprosy using a metaisomer-^{131}I-sodium benzoate. The rate and degree of disorder of the antitoxic function of the liver in this pathology were found to depend on the severity of the process and its complications, as well as on the duration and nature of the therapy given. When a good symptomatic treatment is given, the antitoxic function of the liver may improve.—Authors' Summary

Kim, D. A study on histopathological change of leproma after BCG and levamisole injection in lepromatous leprosy patients. Scientia Lepro **4** (1981) 85–96. (in Korean)

BCG (1:10 dilution) 1 ml and levamisole (20 mg) 1 ml were injected into the active nodule of lepromatous leprosy patients locally and separately. The following results were obtained:

a) In the cases of BCG local injection, the nodule showed that the number of *Mycobacterium leprae* was diminished remarkably within eight weeks and lepromatous leproma was changed into borderline histopathologically.

b) In the cases of levamisole local injection, the nodule showed that the number of *M. leprae* was diminished rapidly and lepromatous macrophage was changed to borderline macrophage histopathologically.

c) It is considered that the T cells sensitized by BCG antigen can stimulate lepromatous macrophage non-specifically and activation of macrophage can be induced.

d) It is considered that levamisole can stimulate the regulatory T cells to restore homeostasis in a perturbed immune system and lepromatous macrophage can be activated specifically.

e) These experimental findings suggest that the BCG and levamisole immunotherapy in order to diminish Morphological Index rapidly for lepromatous leprosy may be possible as well as chemotherapy.—(*Adapted from* Author's Summary)

Kirchheimer, W. F. and Sanchez, R. M. Intraspecies differences of resistance against leprosy in nine-banded armadillos. Lepr. India **53** (1981) 525–530.

Infection of nine-banded armadillos with decreasing doses of armadillo-passaged leprosy bacilli shows that most individuals of this species are susceptible and only about 20% are resistant, regardless of the size of the infecting bacterial dose. It is pointed out that the intraspecies distribution of resistance to leprosy in human beings and in nine-banded armadillos differs because most individuals of the former species are resistant. Attention is drawn to the possibility that the results of antileprosy vaccination in armadillos might not apply to vaccination of human beings because the differences in distribution of resistant individuals might also reflect different mechanisms of susceptibility in the two species.—Authors' Summary

Lee, H. and Kim, Y. Study on diagnosis of leprosy by FLA-ABS test. Scientia Lepro **4** (1981) 39–48. (in Korean)

To make a serodiagnosis of leprosy, indirect immunofluorescent antibody techniques were done for detecting antibodies to specific antigens of *Mycobacterium leprae*.

In mycobacterial disease, however, a broad spectrum of common antigenicity among various strains of mycobacteria exists and it is necessary to remove cross-reactive antibodies to antigens of other mycobacterial species.

For that purpose, the serum is absorbed by suspensions of BCG and *M. vaccae*, and in LL cases the sera often causes biologically false-positive reaction in S.T.S. with cross-reaction with mycobacterial lipid antigens and causes non-specific immunofluorescence, and so these antibodies also were absorbed by cardiolipin and lecithin.

The summary of results of FLA-ABS are as follows: a) 10 out of 10 lepromatous leprosy patients (100%) are positive and average antibody titer is 2.60 ± 0.73. b) 10 out of 10 borderline lepromatous leprosy patients (100%) are positive and average antibody titer is 1.70 ± 0.59. c) 5 out of 10 borderline tuberculoid leprosy patients (50%) are positive and average antibody titer is 0.70 ± 0.65. d) 5 out of 10 tuberculoid leprosy patients (50%) are positive and average antibody titer is 0.60 ± 0.55. e) 2 out of 10 healthy leprosy contacts (20%) are positive.—(*Adapted from* Authors' Summary)

Løvik, M. and Closs, O. Repeated delayed-type hypersensitivity reactions against *Mycobacterium lepraemurium* antigens at the infection site do not affect bacillary multiplication in C3H mice. Infect. Immun. **36** (1982) 768–774.

Delayed-type hypersensitivity was induced in cyclophosphamide-pretreated C3H/TifBom mice by subcutaneous immunization in the thorax with ultrasonicated *Mycobacterium lepraemurium* bacilli in Freund incomplete adjuvant. Seven weeks after immunization, 2.5×10^7 acid-fast *M. lepraemurium* bacilli suspended in diluted sonicate were injected into one hind foot pad, and during the next six weeks three additional injections of sonicate were given at intervals into the infected foot pad. After each injection a strong local reaction developed, which after the first three injections peaked at 24 hr. The kinetics of the reaction was accelerated after the repeat injections. Each time the reaction subsided within one week. From two days to 11 weeks after the inoculation of bacilli there was a 10-fold increase in bacillary numbers in the foot pad and a 3000-fold increase in the draining popliteal lymph node. The degree of bacillary multiplication was the same in animals which had experienced repeated local reactions and in control animals. Thus, repeated strong delayed-type hypersensitivity reactions to *M. lepraemurium* antigens apparently were without any measurable effect on the bacillary multiplication. This observation provides further evidence for a dissociation in C3H/TifBom mice between delayed-type hypersensitivity to soluble mycobacterial antigens and protective immunity against mycobacteria. Possible explanations for our findings are discussed.—Authors' Summary

Melsom, R., Harboe, M., Duncan, M. E. and Bergsvik, H. IgA and IgM antibodies against *Mycobacterium leprae* in cord sera and in patients with leprosy: An indicator of intrauterine infection in leprosy. Scand. J. Immunol. **14** (1981) 343–352.

A solid-phase radioimmunoassay was developed for demonstration and quantification of IgA and IgM anti-*Mycobacterium leprae* antibodies. IgA and IgM anti-*M. leprae* antibodies were demonstrated in a lepromatous serum pool, in various amounts in individual patients with lepromatous leprosy, and in lower concentration in tuberculoid leprosy and nonleprosy controls. IgA and IgM anti-*M. leprae* antibodies were demonstrated in cord sera from babies of mothers with leprosy. The reliability of fetal IgA and IgM antibody synthesis as an indicator of intrauterine infection in leprosy is discussed.—Authors' Summary

Melsom, R., Harboe, M., Myrvang, B., Godal, T. and Belehu, A. Immunoglobulin class specific antibodies in *M. leprae* in leprosy patients, including the indeterminate group and healthy contacts as a

step in the development of methods for sero-diagnosis of leprosy. Clin. Exp. Immunol. **47** (1982) 225–233.

IgA, IgM and IgG anti-*Mycobacterium leprae* antibody activity was quantitated by solid phase radioimmunoassay in groups of untreated leprosy patients throughout the spectrum, in lepromatous leprosy patients treated for more than ten years, in an indeterminate leprosy group, and in a non-leprosy control group. IgA, IgM and IgG anti-*M. leprae* antibody activity increased from the group of healthy individuals exposed to *M. leprae* but without clinical signs of leprosy to tuberculoid (BT and BT/TT) and further to lepromatous (BL to LL) leprosy. There was a considerable overlap in IgA antibody activity, while the overlap between controls and tuberculoid and lepromatous leprosy was less than 20% in the IgM and IgG assays. After more than ten years of treatment, the IgG anti-*M. leprae* activity had decreased markedly; whereas there was less effect in the IgA assay and no significant change in the IgM assay. In contrast to earlier findings, the group of strictly indeterminate leprosy showed signs of an active humoral immune response against *M. leprae*. The IgM anti-*M. leprae* activity was higher in indeterminate leprosy than in the control group with virtually no overlap. IgA anti-*M. leprae* was higher in indeterminate leprosy, but with considerable overlap with the controls. No difference between these two groups was found in the IgG assay. The results are discussed in relation to the value of the various immunoglobulin specific anti-*M. leprae* assays for different purposes, including development of techniques for sero-diagnosis of leprosy.—Authors' Summary

Pacin, A. and Fliess, E. L. Etiopatogenia de los episodios reaccionales. (Etiopathogenesis of reactional episodes.) Leprologia **23** (1981) 27–30. (in Spanish)

The authors review the mechanism of tissue damage in the distinct forms of reactional episodes in leprosy, analyzing the phenomena of hypersensitivity of the types III and IV of Gell and Coombs. The authors emphasize the importance of alterations in lysosomes as a conditioning factor in the development of reactional episodes together with increased capillary endothelial permeability and damage to vascular innervation.—(*Adapted from* the Authors' Summary)

Robins, K., Leena Devi, K. R., Vijayakumar, T. and Gopinath, T. Liver in leprosy. II. Histopathological changes. Lepr. India **53** (1981) 600–607.

Liver biopsy studies were conducted in 77 leprosy patients. The first group of 42 patients were not on any treatment; whereas the 28 patients in the second group were being treated for varying periods. The rest, seven patients in the third group, were clinically quiescent. Microscopic changes in liver biopsy specimens were mainly epithelioid cell granuloma, foam cell granuloma, nonspecific inflammatory reaction characterized by lymphocytes and polymorphonuclear leukocytes, and to a lesser degree hepatocytolysis and fatty degeneration. The lesions were fewer in the group getting treatment compared with the untreated group.—Authors' Summary

Stanford, J. L. A mycobacteriologist's view of the immunology of leprosy. Bull. Inst. Pasteur **79** (1981) 261–275.

Despite the presence of antibodies to many mycobacterial antigens in most leprosy patients, these patients, in common with tuberculosis patients, lack effective cell-mediated mechanisms to common mycobacterial (group I) antigens. In contradistinction, protective immunity stimulated by BCG vaccination in those places where it appears to work, almost certainly is associated with cellular recognition of these group I antigens. Additionally, lepromatous patients have lost the capacity to produce listeria-like responses, even to species-specific (group IV) antigens, and are thus unable to react to species like *Mycobacterium leprae* and some of the non-pathogenic environmental mycobacteria. This enables leprosy bacilli to multiply unchecked in their tissues and is the umbrella of immune unresponsiveness beneath which organisms such as corynebacteria and scotochromogenic mycobacteria may lurk. Immunoprophylaxis may lie in the induction of, and

immunotherapy in the restoration of, cellular reactivity to group I mycobacterial antigen.—(*Adapted from* the article)

Stavri, D., Niculescu, D. and Stavri, H. The *Mycobacterium smegmatis* peroxidase, cross-reacting antigen with *Mycobacterium leprae*. Arch. Roum. Pathol. Exp. Microbiol. **40** (1981) 123–126.

It is demonstrated that one of the four antigens of *Mycobacterium smegmatis* endocellular extract which react with sera of leprosy patients is a peroxidase.—Authors' Summary

Valentijn, R. M., Faber, W. R., Lai A Fat, R. F. M., Chan Pin Jie, J. C., Daha, M. R. and van Es, L. A. Immune complexes in leprosy patients from an endemic and nonendemic area and a longitudinal study of the relationship between complement breakdown products and the clinical activity of erythema nodosum leprosum. Clin. Immunol. Immunopathol. **22** (1982) 194–202.

The sera from 29 leprosy patients living in Surinam (endemic) and 41 leprosy patients living in The Netherlands (nonendemic) were tested for circulating immune complexes (CIC) with the Clq-binding assay and the conglutinin-binding assay and for complement levels including the breakdown product of C3 (C3d). In patients from the endemic area, CIC were found with both assays throughout the entire leprosy spectrum. However, in untreated tuberculoid (T) and borderline tuberculoid (BT) leprosy patients from the nonendemic area, no CIC could be detected with either assay. These findings suggest that other factors in the endemic area, such as other tropical infections, might be responsible for the occurrence of CIC in these patients. In contrast, conglutinin-binding immune complexes were found in ten out of 12 patients with T and BT leprosy who lived in the nonendemic area and received treatment. For seven of these ten patients only IgM was demonstrated in the CIC. The possible mechanisms involved in the appearance of conglutinin-binding immune complexes are discussed. Since CIC were found in patients with and without erythema nodosum leprosum (ENL), they were not specific for this disorder. Measurement of the C3d levels revealed a significant and specific correlation between elevated C3d levels and ENL ($p < 0.0001$). A close relationship between the clinical activity of ENL and the height of the C3d levels was found for all five patients in the longitudinal study. The findings of CIC and elevated C3d levels as well as the longitudinal data provide further evidence of an immunological pathogenesis of ENL, possibly related to immune complexes.—Authors' Summary

Yamaura, N., Akiyama, T. and Nakano, T. Mitogen-induced DNA synthesis in various mouse strains infected with a large or small dose of murine leprosy bacilli. Microbiol. Immunol. **25** (1981) 245–255.

Mice of the C57BL strain have been shown to be rather resistant to infection with *Mycobacterium lepraemurium*; whereas C3H mice are highly susceptible. Accordingly, it seemed to be somewhat paradoxical that enhanced antibody formation coupled with a depressed state of cell-mediated immunity as expressed by negative macrophage migration inhibition tests was observed not in C3H but in C57BL mice when they were inoculated with a large dose of murine leprosy bacilli, as reported in our previous studies.

In the present study mitogen-induced DNA synthesis by lymph node cells was examined in 16 strains of mice which had been infected with a large or small dose of *M. lepraemurium*. According to the response to two kinds of T cell mitogens, these mouse strains could be roughly divided into three groups consisting of two polar groups represented by C57BL/6J and C3H/HeN, respectively, and one intermediate between them. Furthermore, both humoral and cellular immune responses so far observed in C57BL and C3H mice were substantiated by DNA synthesis by lymph node cells harvested from these strains of mice and then exposed *in vitro* to B cell and T cell mitogens, respectively. However, no correlation was found between mitogen-stimulated DNA synthesis by these 16 strains of mice and their H-2 specificity.—Authors' Summary

Microbiology

Bhide, M. B., Dholam, S. B. and Chatterjee, B. R. Inhibition of foot pad multiplication of *M. leprae* in mice vaccinated with leproma derived *M. leprae* precursor coccoid organism and passive transfer of DTH response to normal mice through infusion of splenic cells of such vaccinated mice. Lepr. India **53** (1981) 580–587.

Mice prevaccinated with a non-acid-fast, coccoid organism of leprous origin greatly suppressed multiplication of *Mycobacterium leprae* in the foot pad. Splenic cells from such vaccinated mice were able to passively transfer the DTH response to *M. leprae* in the recipient mice.—Authors' Summary

Chatterjee, B. R. Skin test response to *M. leprae* precursor coccoid organisms in a high leprosy endemic area as compared to lepromin. Lepr. India **53** (1981) 566–579.

The paper describes the results of several hundred skin tests on humans using antigens from leprosy derived, non-acid-fast, coccoid organisms, and a mycobacterium that grew out of one of the coccoid organisms. Early skin test response to the cytoplasmic fraction of one of the leprosy derived, non-acid-fast, coccoid organisms was very highly correlated with standard lepromin.—Author's Summary

Daffé, M., Laneelle, M. A., Promé, D. and Asselineau, C. Étude des lipides de *Mycobacterium gordonae* comparativement à ceux de *M. leprae* et de quelques mycobactéries scotochromogénes. (Studies on the lipids of *Mycobacterium gordonae* in comparison with those of *M. leprae* and of some other scotochromogenic mycobacteria.) Ann. Microbiol. (Paris) **132** (1981) 3–12. (in French)

The mycolic acids were isolated from *Mycobacterium gordonae* (strain ATCC 14470) and purified by thin layer chromatography. Three species were studied by mass spectrometry. The analogy between *M. gordonae* and *M. leprae*, based on the lack of tuberculostearic acid, was supported by the comparison of the structures of their mycolic acids.

Succinct analyses of the lipids of three other scotochromogenic strains of mycobacteria using thin layer chromatography and gas-liquid chromatography were performed. These strains are more remote from *M. gordonae* than is *M. leprae*, as far as the lipid content is concerned.—Authors' Summary

Imaeda, T., Kirchheimer, W. F. and Barksdale, L. DNA isolated from *Mycobacterium leprae*: Genome size, base ratio, and homology with other related bacteria as determined by optical DNA-DNA reassociation. J. Bacteriol. **150** (1982) 414–417.

DNA derived from *Mycobacterium leprae* (grown in armadillos) was isolated, purified, and analyzed spectrophotometrically. The genome size and the guanine-plus-cytosine content of *M. leprae* were 1.3×10^9 and 55.8%, respectively. Among selected strains of mycobacterial, nocardial, and corynebacterial species, *Corynebacterium* sp. 2628 LB, isolated from a human leprosy patient, showed the highest DNA homology with *M. leprae*. Of the DNAs derived from mycobacteria, those of *M. tuberculosis* and *M. scrofulaceum* showed a comparatively high reassociation with the DNA of *M. leprae*.—Authors' Summary

Ishaque, M., Adapoe, C. and Kato, L. Phosphorylation oxydative chez *Mycobacterium lepraemurium*. (Oxydative phosphorylation in *Mycobacterium lepraemurium*.) Rev. Can. Biol. **39** (1980) 219–223. (in French)

The generation of ATP by cell-free extracts of *Mycobacterium lepraemurium* isolated from Sprague-Dawley rats was investigated. Cell-free preparations catalyzed phosphorylation coupled to the oxidation of NADH and succinate yielding P/O ratios of 0.6 and 0.4, respectively. Ascorbate oxidation did not result in ATP formation. The oxidative phosphorylation was uncoupled by 2,4-dinitrophenol and pentachlorophe-

nol. Phosphate esterification coupled to NADH oxidation was inhibited by rotenone which had no effect on ATP synthesis associated with succinate oxidation. Antimycin A and cyanide completely inhibited phosphorylation coupled to the oxidation of NADH or succinate.—Authors' Summary

Janczura, E., Abou-Zeid, C., Gailly, C. and Cocito, C. Chemische Identifizierung einiger Zellwandkomponenten von aus menschlichen Lepraläsionen isolierten coryneformen Mikroorganismen. (Chemical identification of some cell wall components of microorganisms isolated from human leprosy lesions.) Zentral Bakteriol. Mikrobiol. Hyg. (A) **251** (1981) 114–125. (in German)

The cell walls of 24 coryneform non-acid-fast, Gram-positive organisms isolated from human leprosy lesions, were hydrolyzed and analyzed. Four known chemical markers of different high polymer components of the walls of microorganisms of the CMN (*Corynebacterium, Mycobacterium, Nocardia*) group were detected in whole cells and cell wall hydrolysates of the coryneform bacteria analyzed. These markers were: meso-diaminopimelic acid (peptidoglycan), arabinose and galactose (arabinogalactan), and mycolic acids. In addition, mycolic acids proved to be of the corynomycolic type, as shown by thin layer chromatography analysis. The conclusion was drawn that these coryneform strains independently isolated from patients of different countries, represent a homogeneous group within the genus *Corynebacterium*. This inference is supported by a parallel work showing that the guanine-plus-cytosine content of the DNA of these coryneform strains falls within the range of values characteristic of true corynebacteria pathogenic for animals.—Authors' Summary

Khanolkar, S. R. Preliminary studies of the metabolic activity of purified suspensions of *Mycobacterium leprae*. J. Gen. Microbiol. **128** (1981) 423–425.

Mycobacterium leprae isolated from armadillo tissue incorporated radioactivity from D-[^{14}C]glucose and [^{14}C]protein hydrolysate. In the presence of glucose, the rate of incorporation of [^{14}C]protein hydrolysate was increased. Uptake of glucose was inhibited by 2-deoxy-D-glucose and sodium azide; that of the amino acids was inhibited by puromycin and chloramphenicol and, weakly, by cycloheximide.—Author's Summary

Matsuo, Y. and Tatsukawa, H. *In vitro* growth of *Mycobacterium lepraemurium* under the influence of macrophage cultures. Microbiol. Immunol. **25** (1981) 801–805.

Elongation and limited multiplication of *Mycobacterium lepraemurium* was observed extracellularly when the bacilli spotted on a coverslip were placed face to face with cultures of mouse peritoneal macrophages adhering to the inside of a test tube held at an angle of 15°. There was no doubt that certain growth-promoting but unstable factors were released from the macrophages.—Authors' Summary

Nakamura, M. Growth stimulation of *Mycobacterium lepraemurium* in cell-free liquid medium by vitamin K_3 and B_{12}. Jap. J. Lepr. **50** (1981) 135–138. (in Japanese)

Effects of vitamin K_3 and B_{12} on the growth of *Mycobacterium lepraemurium* in NC-5 medium containing soluble starch were investigated. Results: It was significantly indicated that vitamin K_3 as well as B_{12} remarkably stimulated the primary growth of *M. lepraemurium*, and the optimal concentrations of each vitamin were 0.005 μg and 0.4 μg/ml, respectively.—(*Adapted from* Author's Summary)

Vidyasagar, P. B., Damle, P. S. and Antia, N. H. A study of the sciatic nerve compound action potential *in vitro* in normal and *M. leprae* infected mice. Lepr. India **53** (1981) 537–555.

A study of the sciatic nerve compound action potential was carried out in normal and non-immunosuppressed Swiss mice (white) inoculated with 5000 *Mycobacterium leprae* in each hind foot pad, from the first to the seventh post-inoculation month.

In normal mice, the threshold for stimulation, maximum amplitude, duration, and conduction velocity of all the three com-

ponents of the compound action potential were measured. Progressive changes were noted in amplitude and the threshold for stimulation of the unmyelinated fiber ('C' fibers) potentials. These changes were compared with the changes observed in the myelinated fiber potentials.—Authors' Summary

Experimental Infections

Corona, C. J. J., Amerio, N., Bottasso, A., Poli, H. and Morini, J. C. Infeccion experimental con *Mycobacterium lepraemurium* en ratones CBA/J. Efectos de la perinmunizacion sobre la evolucion de la enfernedad. (Experimental infection with *Mycobacterium lepraemurium* in the CBA/J mice. Effects of preimmunization on the evolution of the disease.) Leprologia **23** (1981) 19–25. (in Spanish)

CBA/J adult mice were immunized with *Mycobacterium lepraemurium, M. lepraemurium* plus incomplete adjuvant, and incomplete adjuvant alone. Thirty days later they were infected intraperitoneally with a high dose of viable *M. lepraemurium*. Animals receiving incomplete adjuvant alone showed the most rapid progression of the infection. The animals receiving *M. lepraemurium* either with or without incomplete adjuvant showed a more rapid progression in the disease than untreated control mice.—(*Adapted from* the Authors' Summary)

Tanemura, M. Susceptibility to *Mycobacterium avium* of various inbred strains of mice. I. On the cases with intraperitoneal infection. Jap. J. Lepr. **50** (1981) 74–90. (in Japanese)

Comparative observations were made of the susceptibility of various inbred mouse strains (C3H, C57BL/6, DDD, BALB/c and KK) to intraperitoneal infection with avian tubercle bacilli, strain Kirchberg, concerning development of their visceral lesions, multiplication of the bacilli in the visceral organs, and mean survival time of the infected mice.

Following intraperitoneal infection, the visceral lesions developed early in the KK strain and became so severe as to cause the ultimate death of the host; while in the C3H strain, the visceral lesions developed more slowly and remained still slight at the late stage of infection. The development of visceral lesions in the other strains was intermediate to that observed in these two, but much closer to the KK strain.

These mouse strain differences in the susceptibility are assumed to be mainly due to multiplication rate of the bacilli in the host.—Author's Summary

Tanemura, M. Susceptibility to *Mycobacterium avium* of various inbred strains of mice. II. On the cases with subcutaneous infection. Jap. J. Lepr. **50** (1981) 116–127. (in Japanese)

Avian tubercle bacilli, strain Kirchberg, were inoculated subcutaneously on the thorax of five inbred strains of mice (C3H, C57BL/6, DDD, BALB/c and KK) in order to examine the development of local and visceral lesions at varying time intervals.

In almost all the mice of each strain, a small, hard and sharply defined nodular infiltrate developed at the inoculation site within two to three weeks. At about 10 to 15 weeks, the nodule stopped growing and tended to regress spontaneously, and in all the mice examined the visceral lesions were slight at that time.

At the late stage of infection, however, there were remarkable differences in visceral lesions among the tested strains of mice, while subcutaneous lesions were still slight. At 35 to 50 weeks, extensive involvement was found in the lung, liver, and spleen of KK and BALB/c mice, and many bacilli-loaded cells were found in the lungs of C57BL/6 mice. Visceral lesions of C3H and DDD mice, however, were very slight even in the late stage of infection.

Mouse strain differences in visceral lesions of the subcutaneously infected mice showed similar tendencies to those of the intraperitoneally infected mice.—(*Adapted from* Author's Summary)

Epidemiology and Prevention

Comportamiento de la endemia de lepra en Mexico Durante 1980. Epidemiologia **1** (1981) 1–3.

Al finalizar el anõ de 1979 habia en el pais 15 237 enfermos de lepra en registro activo, lo que representa una tasa de prevalencia de 0.22 por 1 000 habitantes. Durante 1980 se notificaron 621 casos nuevos, o sea 36 menos que los descubiertos en 1979; esto confirma lo que ha venido observándose desde hace 15 años: que la incidencia de la lepra en México muestra una accentuada tendencia descendente.

En todas las entidades federativas, con excepción de Hidalgo, Puebla, Tabasco y Quintana Roo, se descubrieron casos nuevos de la enfermedad. Los estados que más casos notificaron fueron: Sinaloa (150). Jalisco (105), Guanajuato (66), Michoacán (57), Sonora (26) y Colima (18); entre todos, en 67.9 por 100 de los casos registrados en todo el pais.

Los casos nuevos se encontraron distribuidos en 353 localidades de 229 municipios; 14 por 100 (154) pertenecian al medio urbano y 56 por 100 (199) al rural. En las primeras residian el 52 por 100 de los enfermos (321) y en las rurales el 48 por 100 (300). Ello indica que la endemia de lepra está muy difundida y que, si anteriormente predominaba en el medio rural, en la actualidad es cada vez más un problema urbano, particularmente de las grandes ciudades.

Los casos nuevos fueron identificados de la siguiente forma: 53 por 100 (329) por las brigadas móviles y 40 por 100 (251) por los Centros Dermatológicos. El Hospital General de la Ciudad de México, dependiente de las S.S.A., notificó el 4 por 100 de los casos (24) y otras instituciones del sector salud consignaron el 3 por 100 (17).

En cuanto al modo de descubrimiento, es sabido que en este sentido los procedimientos más eficaces son la consulta médica a personas con sintomas cutáneos y la notificación de las instituciones sanitarias y los médicos privados. Esta vez la consulta dermatológica descubrió al 43 por 100 de los pacientes (268), y mediante notificación se localizó al 34 por 100 (216); esto arroja un coeficiente de ataque de 1.8 por 1 000.

En la mayoria de estos pacientes el padecimiento estaba muy avanzado; varios de ellos eran baciliferos y, por tanto, fuente de contagio. Tomando en cuenta a los identificados en la consulta dermatológica, el 60 por 100 (185) padecian lepra lepromatosa (LL) y lepra dimorfa (LD); el 13 por 100 (34), lepra tuberculoide (LD); y el 18 por 100 (49), lepra indeterminada (LI). Entre los casos notificados el 70 por 100 (149) correspondió a LL y LD, el 13 por 100 (27) a LT y el 17 por 100 (36) a LI.

En cambio, mediante la revisión de contactos el diagnóstico es precoz y en la mayoria de los casos el padecimiento es incipiente. Por este procedimiento se descubrió al 21 por 100 de los enfermos (131), o sea un coeficiente de ataque de 6.2 por 1 000. El 49 por 100 (54) padecian LI, 24 por 100 (32) LT y 34 por 100 (38) LL y LD.

En términos generales, la detección no fue oportuna, ya que en 46 por 100 de los casos (287) el padecimiento tenia más de cinco años de evolución, en 47 por 100 (292) de uno a cinco y en 7 por 100 (42) menos de uno (véanse las recomendaciones al final). Cabe señalar que en 28 por 100 de los enfermos (163) el padecimiento habia sido diagnosticado previamente y llevaban varios años bajo tratamiento sulfónico. Por otra parte, el 72 por 100 (418) no habian recibido tratamiento alguno y en 40 casos no se pudo precisar este dato.

En nuestro pais continúan predominando las formas abiertas de la lepra: 62 por 100 (386) sufrian LL y LD, 23 por 100 (142) LI y 15 por 100 (93) LT. El estudio baciloscópico fue positivo en 49 por 100 (187) de los pacientes aquejados de LL.

Por edades, la mayor afección se encuentra a partir del segundo decenio de la vida. En la fecha que fueron registrados, el 94.4 por 100 de los pacientes (386) tenian 15 años o más de edad y el 5.6 por 100 (36) eran menores. En cuanto al sexo, 59.9 por 100 (372) pertenecian al masculino y 40.1 por 100 (249) al femenino.—(*Adapted from* the article)

Mikhailov, P. and Dimitrova, I. Die lepra in Bulgarien. Epidemologie, Klinische For-

men und Therapie. (Leprosy in Bulgaria. Epidemiology, clinical forms, and treatment.) Z. Hautkr. **56** (1981) 1366–1370. (in German)

Leprosy is a rare disease in Bulgaria. There have been 58 cases registered during the last 100 years. The number of leprosy patients in 1980 was 13, most of them from the northern part of the country.

The epidemiological studies indicate that in some of the cases the infection has been acquired in other countries (South America, Romania, Yugoslovia, the Caucasian region). In most cases, however, the disease has been acquired in Bulgaria by an unknown source of infection. The most frequent clinical form is lepromatous leprosy and the rarest, indeterminate leprosy.

All patients have been treated with 4,4-diaminodiphenyl sulfone (DDS) combined with thiambutosine. The length of treatment depends upon the clinical type of leprosy. The results of the treatment are promising. Only two patients still reveal acid-fast bacilli.—Authors' Summary

Miyanaga, K., Juji, T., Maeda, H., Nakajima, S. and Kobayashi, S. Tuberculoid leprosy and HLA in Japanese. Tissue Antigens **18** (1981) 331–334.

HLA phenotypes of 54 patients with tuberculoid leprosy were compared with those of 167 healthy controls. Frequencies of HLA-A, -B and -C antigens did not differ significantly between the leprosy patients and the controls. However, an increase in the frequencies of DR1, DR2, DRW8, and MT1 antigens, and a decrease in the frequencies of DR4 and MT3 antigens were observed in the leprosy patients. Statistical evidence was presented that MT1 antigens were primarily associated with tuberculoid leprosy in Japanese patients rather than DR2.—Authors' Summary

OMSLEP recording system. Reprinted from WHO Wkly. Epidem. Rec. **34** (1981) 262–270.

The proposed OMSLEP information system for leprosy control includes a set of three recording forms:

1. The Individual Patient Form (IPF) which should be completed for each patient at the time of registration, at the end of the first calendar year following registration, and at the end of each subsequent year. The form constitutes a summary of the clinical record of a patient. It should not in any way replace the local clinical record currently used. However, modifications of local clinical records become necessary when information required for the completion of the IPF form is lacking. The purpose of the IPF form is to aggregate on an annual basis the clinical data recorded during the year. The form, with a first line for the information recorded at the time of registration, and one line for each following year, makes it possible to carry out cohort studies indicating for instance the rates of inactivation according to treatment rates. It ensures the recording of standard data so that the other two proposed forms, i.e. the Detection Form (DF) and the Annual Statistics Form (ASF) may be completed.

2. The Detection Form (DF) should constitute the end-of-year summary of all new patients registered during the year. It is compiled from data recorded on the Individual Patient Form (IPF) and includes such data as the total number of new cases detected and registered, the clinical classification of cases (indeterminate, tuberculoid, borderline or lepromatous leprosy), sex and age. Additional information may include information on disabilities and contacts.

3. The Annual Statistics Form (ASF) constitutes an annual summary of all the cases remaining on the register at the end of the year. It is compiled from the Individual Patient Form (IPF) and includes such data as the clinical classficiation of the cases (indeterminate, tuberculoid, borderline or lepromatous leprosy), bacteriological findings, mode of treatment, and attendance for treatment. Reports from individual health units should be consolidated at the end of each calendar year at district, regional and country level, depending on the organization of health services. National data thus derived would be comparable with those of other countries and be of great epidemiological value. (*From* the reprint)

Revankar, C. R., Dudhalkar, B., Raju, G. D. and Ganapati, R. Leprosy surveys in urban slums—possibilities for epidemio-

logical investigations. Lepr. Rev. **53** (1982) 99–104.

Rapid industrialization and a population explosion in urban areas like Bombay have promoted the growth of a large number of slums where some 40% of the city's population is living in an overcrowded, unhygienic environment. This has led to many acute and chronic public health problems, one of the gravest of which is leprosy. Intensive surveys of eight slums, in which 31,950 subjects were screened for leprosy, revealed a range of prevalence between 5.9/1000 and 22.8/1000 with an average rate of 11.9/1000, thus indicating slums as hyperendemic foci. The average smear-positive case prevalence rate was 1.1/1000 and this shows a high quantum of infection in the slum communities. Contrary to general belief, these urban slums are stable in nature, housing a population coming from different parts of India. Various epidemiological investigations relating to leprosy under urban conditions therefore seem to be possible if our experience is indicative.—Authors' Summary

Soendijojo, A., Ilias, M. I. and Hudiono, H. Leprosy control in Surabaya. Lepr. Rev. **53** (1982) 91–97.

The number of registered leprosy cases in Surabaya, Indonesia, which has 2.5 million inhabitants, in December 1978 was 3118, but it has been estimated that the total of leprosy patients is probably around 5000. The prevalence of leprosy in this city is at least 1.25 per 1000 inhabitants. The Department of Dermato-Venereology of the Dr. Sutomo Hospital in Surabaya, which is a general as well as a teaching clinic, is involved in many leprosy control activities. The latter covers among other aspects: epidemiological studies; passive and active case detection; free medical care for more than 75% of the registered leprosy cases in Surabaya; rehabilitation; health education to the patients and their relatives, to other medical staff members and the community; teaching activities; research work; and cooperation with the Netherlands Leprosy Relief Association to combat leprosy in and around Surabaya.—Authors' Summary

van Eden, W., Mehra, N. K., Vaidya, M. C., D'Amaro, J., Schreuder, G. M. T. and van Rood, J. J. HLA and sporadic tuberculoid leprosy: A population study in Maharashtra, India. Tissue Antigens **18** (1981) 189–193.

A population study to test whether associations between HLA and sporadic, i.e., non-familial, tuberculoid leprosy exist was undertaken in a hyperendemic area in India. Since previous family studies in the same area had shown both non-random haplotype segregation in the family members affected with tuberculoid leprosy and the preferential segregation of HLA-DR2 into tuberculoid leprosy patients, an increased frequency of DR2 among the "sporadic" patients was expected. However, no heterogeneity for HLA was detected between patients and controls. These findings could indicate that tuberculoid leprosy is a heterogeneous disease with regard to genetic background.—Authors' Summary

Rehabilitation

Duerksen, Frank. B) Leprosy. Transactions of the Seventh International Congress of Plastic and Reconstructive Surgery. Ely, J. F., ed. São Paulo, Brazil: Sociedade Brasileira de Cirurgia Plástica, 1979.

A special appeal has been made to plastic and reconstructive surgeons to take on the task of treating the physical, stigmatizing and disabling deformities in the leprosy patient, in order to assist in his total rehabilitation. Most problems seen in this field are caused by direct or indirect nerve damage produced by the *Mycobacterium leprae*. Some deformities in the face are produced by direct invasion of the tissues.

Some of the major problems and their surgical solutions have been presented by regions: in the face, hands, and feet. They present complex and interesting problems

that call for attention from plastic and orthopedic surgeons in order that they should deal with them. These patients should no longer be considered second or third rate humans and should benefit from your expertise.

The great man, Mahatma Gándhi said: "If you can change the life of a leprosy patient or change his values, you can change a village and a whole country."—Author's Summary

Kumar, K. Surgical management of leprous ulnar neuritis. Clin. Orthop. **25** (1982) 235–242.

An analysis of the results of neurolysis with careful anterior transposition of the ulnar nerve in 17 cases of severe leprous neuritis is described. Pain and paresthesia were relieved in all patients within 48 to 72 hr after the operation. Recoverable cases showed some evidence of sensory and motor recovery within three weeks to three months and six months of the operation, respectively. The amount of recovery was directly related to the extent and stage of involvement of the nerve. Results of prophylactic anterior transposition of the ulnar nerve in two patients with recurrent dislocation were encouraging.—Author's Summary

Pati, L. and Behera, F. Metatarsal head pressure (MHP) sores in leprosy patients. Lepr. India **53** (1981) 588–593.

Excision of head and neck of the corresponding metatarsal bone for MHP sore cases was done in 43 patients, both dorsal and plantar approach. The effect of this operation was evaluated for more than one year with extremely satisfactory results.—(*Adapted from* Authors' Summary)

Prasad, S. A survey of leprosy deformities in a closed community. Lepr. India **53** (1981) 626–633.

Out of 1011 leprosy patients, 200 (20%) cases with permanent deformities were found in the Leprosy Control Unit, Raxaul (East Champaran), Bihar, India. The statistical data of selected patients and the types of various deformities are presented. The prevalence rate and incidence pattern of deformities reported by other workers are compared.—Author's Summary

Reddy, N. R. and Kolumban, S. L. Effects on fingers of leprosy patients having surgical removal of sublimus tendons. Lepr. India **53** (1981) 594–599.

A retrospective study was carried out by the analysis of 212 charts of leprosy patients attending the Schieffelin Leprosy Research and Training Centre for the period 1964 to 1974. The purpose was to determine what changes were evident in postoperative fingers after their sublimus tendons were surgically removed for some other purposes, such as for use as a motor tendon for opponens replacement, etc.

At the conclusion of the analysis it was found that there were five negative and two positive effects for these fingers. The negative effects were postoperative development of: 1) Swan neck deformity (83%), 2) T.I.P. extension limitation, 3) P.I.P. flexion limitation, 4) T.I.P. flexion, and 5) M.P. extension limitation. The positive effects were: improvement of both hooding deformity (boutonnière) and P.I.P. extension limitation. The reasons for these negative and positive effects are discussed.—(*Adapted from* Authors' Summary)

Other Mycobacterial Diseases and Related Entities

Albritton, W. L., Brunton, J. L., Slaney, L. and MacLean, I. Plasmid-mediated sulfonamide resistance in *Haemophilus ducreyi*. Antimicrob. Agents Chemother. **21** (1982) 159–165.

Clinical isolates of *Haemophilus ducreyi* from patients with chancroid were shown to have one or more 4.9- to 7.0-megadalton non-self-transferable plasmids and to have *in vitro* resistance to sulfonamides. Trans-

formation of *Escherichia coli* to sulfonamide resistance was associated with the acquisition of a 4.9-megadalton plasmid, which did not confer linked resistance to streptomycin. The guanine-plus-cytosine content of this plasmid was found to be 57%. Filter-blot hybridization and restriction endonuclease digestion studies suggested a relationship of this plasmid to RSF1010. Electron microscope heteroduplex analysis confirmed this relationship. The identification in *H. ducreyi* of a plasmid closely related to plasmids found in enteric species, rather than transposition of a resistance determinant to an indigenous plasmid, suggests that further dissemination of the enteric plasmid pool to this genus is possible since plasmid transfer between certain *Haemophilus* species is readily demonstrated.—Authors' Summary

Grosset, J., Truffot, Ch. and Boval, C. The role of low dosage prothionamide with and without 4,4′-diaminodiphenyl sulphone for use with isoniazid in the treatment of experimental mouse tuberculosis. Tubercle **63** (1982) 37–43.

To determine whether or not low dosage prothionamide (PTH), with or without diaminodiphenyl sulfone (DDS), can replace PAS or thiacetazone as the companion drug to isoniazid (INH) in the treatment of tuberculosis, two experiments have been performed in mice. In Experiment I, the two-month effectiveness of 25 mg/kg INH alone, INH + PTH (25 mg/kg) or INH + PTH + DDS (10 mg/kg) was investigated. Both PTH-containing regimens were equally effective in preventing the selection of INH-resistant mutants but PTH did not appear to add much to the bactericidal activity of INH. In Experiment II, the one-year effectiveness of similar regimens supplemented by an initial month of streptomycin (SM) was investigated. Again PTH appeared very effective; whereas DDS seemed ineffective. Therefore it seems that PTH is likely to be a good companion drug for INH when used in man at the dosage of 5 mg/kg, which is more or less equivalent to 25 mg/kg in the mouse.—Authors' Summary

Hejny, J. A drug sensitivity test strategy for atypical mycobacteria. Tubercule **63** (1982) 63–69.

The value of anti-tuberculosis drugs for the treatment of infections caused by atypical mycobacteria is limited by the high prevalence of drug resistance. From the mycobacteriological point of view, however, nonspecific antibiotics and sulfonamides can also be used for their therapy. Atypical mycobacteria are highly heterogeneous in their drug sensitivity patterns and in this respect each strain virtually represents a distinct biological unit. To select suitable drugs for combined treatment, advantage should be taken of an analytical quantitative proportional sensitivity test that will allow determination of primary resistant population frequency per million viable mycobacterial units. In each case treatment should be with a combination of drugs in which the frequency of primary resistant populations is 10^{-5} or lower.—Author's Summary

Izumi, A. K. and Matsunaga, J. BCG vaccine-induced lupus vulgaris. Arch. Dermatol. **118** (1982) 171–172.

A case of intradermal BCG vaccination was complicated by a lupus-like tuberculosis cutis progressive for over 30 years. The patient had been vaccinated twice with BCG in the affected site. A review of other BCG vaccine-induced cases of lupus vulgaris indicates that the incidence of this complication is markedly increased following multiple BCG vaccinations, but is rare following a single BCG vaccination. In our patient a skin biopsy specimen was characteristic for lupus vulgaris. Acid-fast stains from the tissue and cultures from the affected site were negative. The patient was successfully treated with rifampin.—Authors' Summary

Mackel, S. E. and Jordan, R. E. Leukocytoclastic vasculitis. Arch. Dermatol. **118** (1982) 296–301.

Thirty-nine patients with clinical, histologic, and immunofluorescence evidence of leukocytoclastic (necrotizing) vasculitis were studied for the presence of circulating

immune complexes. These patients were selected prospectively during a three-year interval from patients seen in a dermatology clinic. Clinical and serologic data are summarized and representative cases are presented. This large series of patients with leukocytoclastic vasculitis emphasizes both the frequency of this disorder and the varied disease settings within which it may manifest. The immunopathologic data presented support an immune complex-mediated pathogenesis for this disease process.—Authors' Summary

Mehrotra, M. L., Gautam, K. D. and Chaube, C. P. Shortest possible acceptable, effective ambulatory chemotherapy in pulmonary tuberculosis: Preliminary report 1. Am. Rev. Respir. Dis. **124** (1981) 239–244.

This study in Agra, India, was designed to determine whether the duration of treatment of pulmonary tuberculosis with the available specific drugs could be shortened to three months.

Four hundred patients with bacteriologically confirmed pulmonary tuberculosis were selected to participate. All were aged 12 years or over; none had another complicating disease or was pregnant; none had been treated previously, or for not more than 15 days, and all were available for follow up for two years after the end of treatment.

The patients were allocated at random initially to one of two regimens: (1) rifampin, streptomycin, pyrazinamide and isoniazid; (2) these with the addition of ethionamide. Both were prescribed for three months. These were followed for 1.5 months with a placebo (calcium lactate) or either of the first two regimens for a total of 4.5 months of treatment.

Study of the results in 121 patients at nine months showed that the five-drug regimen with ethionamide had no superiority over the four-drug regimen but was inferior because of side-effects and consequent default. Ethionamide was therefore withheld from new patients entering the trial. Full details of the regimens are tabulated, including dosage and total number of doses given in each.

Sputum conversion was achieved in 96% of patients within two months. No relapses were seen during a 12-month follow up after the completion of the 4.5 month regimen. This was in contrast to a relapse rate of 5% following the three-month regimen.

Adverse effects during the first three months occurred in 3.4% of the patients on treatment that did not include ethionamide and in 6.4% on regimens that did. Default, toxicity and adverse reaction rates were low and of a similar order with the regimens that did not conclude ethionamide. All were acceptable to patients.

The influence of shortening the duration of treatment on success rate and cost of drugs was examined. Treatment for three months gave a success rate of 95% at a cost of U.S. $87 and for two different 4.5 month regimens success rates of 100% and costs of U.S. $118 and $94, respectively. "With the current over-all cost of drugs being limited to 100 United States dollars, the patients with moderately extensive disease must be treated for 100 days, or a maximum of 100 doses."—H. G. Calwell (*From* Trop. Dis. Bull.)

Portaels, F., Goodfellow, M., Minnikin, D. E., Minnikin, S. M. and Hutchinson, I. G. Nocardia-like mycobacteria isolated from natural habitats in Zaire. Ann. Soc. Belg. Med. Trop. **61** (1981) 477–487.

Forty slow-growing actinomycetes were isolated from a variety of natural habitats in Zaire. The organisms were acid-alcohol-fast and formed a primary mycelium covered by abundant aerial hyphae. The majority of the isolates contained mycolic acids characterisic of mycobacteria and formed two homogenous groups on the basis of morphological, biochemical, and physiological properties. These novel mycobacteria were clearly distinguishable from other non-pigmented, slow-growing mycobacteria.—Authors' Summary

Rowe, L. and Cantwell, A., Jr. Hypodermitis sclerodermiformis; successful treatment with ultrasound. Arch. Dermatol. **118** (1982) 312–314.

We report herein the successful use of ultrasound therapy in the treatment of hy-

podermitis sclerodermiformis (HS). It is a skin disease characterized by well-circumscribed, chronic, painful and tender, single or multiple, board-like, indurated, sharply bordered lesions, occurring on the legs of patients with venous insufficiency. Hypodermitis sclerodermiformis is a little-known clinical entity, often undiagnosed or misdiagnosed as phlebitis, cellulitis, or stasis dermatitis. It merits clinical recognition because of the gratifying and unique response it has to treatment with ultrasound therapy.—Authors' Summary (*Editor's Note*: The authors mention that ". . . acid-fast-stained tissue sections may show bacteria." The entity seems to resemble what some leprologists have called "leprous paniculitis.")

Scott, P. A. and Farrell, J. P. Experimental cutaneous leishmaniasis: Disseminated leishmaniasis in genetically susceptible and resistant mice. Am. J. Trop. Med. Hyg. **31** (1982) 230–238.

Leishmania tropica infections in mice provide models for the study of nonhealing leishmanial injections similar to diffuse cutaneous leishmaniasis (DCL) in man. BALB/c mice infected with *L. tropica* developed large non-healing primary lesions as well as multiple metastatic lesions on the feet, face and ears. This susceptibility was not dose- or route-dependent. In contrast, C57BL/6 mice, when inoculated intradermally (ID), developed cutaneous lesions which healed. However, when the normally resistant C57BL/6 mice were inoculated intravenously (IV), they developed multiple non-healing lesions which resembled the infection seen in susceptible BALB/c mice. Thus, non-healing leishmanial infections similar to those of human DCL can be produced in both a genetically susceptible (BALB/c) and resistant (C57BL/6) strain of mouse. Although the eventual outcome of the infection is similar in BALB/c and IV inoculated C57BL/6 mice, the immunological parameters of the infection in the two models differed significantly. *L. tropica* infection in BALB/c mice was associated with a non-specific immunodepression, as assessed by lymphocyte proliferative responses to concanavalin A, phytohemagglutinin and lipopolysaccharide. In contrast, no evidence of generalized immunodepression was observed in the IV-inoculated, non-healing C57BL/6 mice. These two models also differed in their ability to express a delayed skin response to leishmanial antigen during infection. BALB/c mice were capable of mounting a transient delayed skin response, while IV-inoculated C57BL/6 mice developed no detectable delayed hypersensitivity. Both non-healing and healing infections were accompanied by the development of specific indirect immunofluorescent antibody, although the titers were significantly higher in non-healing infections. Spleen cells from infected BALB/c and C57BL/6 (ID- or IV-inoculated) mice responded to leishmanial antigen in a lymphocyte transformation assay. In BALB/c mice the ability to respond to antigen could be demonstrated throughout the course of infection; however, non-healing C57BL/6 mice developed a suppressor cell late in the infection which suppressed leishmanial antigen responses.—Authors' Summary

Siddiqi, S. H., Aziz, A., Reggiardo, Z. and Middlebrook, G. Resistance to rifampicin and isoniazid in strains of *Mycobacterium tuberculosis*. J. Clin. Pathol. **34** (1981) 927–929.

Drug susceptibility studies on strains of *Mycobacterium tuberculosis* isolated from widely different populations of patients (from Pakistan) and tested by two different techniques indicated that all 55 strains resistant to rifampin were also resistant to isoniazid, while many strains resistant to isoniazid were found to be susceptible to rifampin. This observation, which has as yet unknown laboratory and clinical significance, may be particularly useful in management of patients. Further studies are called for to establish this relation. (*From* Trop. Dis. Bull.)