CURRENT LITERATURE

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

General and Historical

Browne, S. G. Leprosy control: Chimeras and possibilities. Bull. Acad. Méd. Belg. **135** (1980) 208–218.

The author reviews the general situation regarding the control of leprosy in the world, particularly in light of the increasing menace of sulfone resistance and the non-availability of a specific vaccine.

After 30 years of widespread monotherapy with sulfones, touching, however, only one-fifth of those needing treatment, the leprosy endemic shows little sign of being controlled except in certain countries where there is a high natural resistance to infection among potential or actual victims. As with other transmissible diseases in countries in the Third World, the situation is complicated by the lack of complete and reliable statistics and by irregularity of treatment.

Two serious complicating factors are now upsetting the prospects for effective control and calling into question the epidemiological assumptions of governments and cooperating voluntary agencies. The first is secondary sulfone resistance with its inevitable consequence of primary sulfone resistance occurring in susceptible contacts; the second is the demonstration of the presence of persister organisms, viable and drug sensitive, in certain tissues despite the exhibition of effective drugs in adequate dosage for adequate periods.

The possibilities for control of leprosy today depend on such time-honored principles as the reduction of the reservoir of infection by correct chemotherapy (i.e., multidrug regimens for multibacillary disease) and hygiene measures to reduce transmission of viable organisms. Primary prevention by stimulating innate immunological defense mechanisms has not so far proved very encouraging, and the administration of dapsone prophylactically is largely impracticable. We await a specific, safe, and inexpensive vaccine and cheap mycobactericidal alternatives to dapsone.—Author's Summary

Cockburn, R. Changing attitudes to leprosy. Middle East Health Supply and Service **4** (1980) 12–14.

This illustrated popular article reports an initiative by the Ministry of Health, Damascus, to modernize the approach to leprosy in Syria, essential to which is the establishment of a leprosy institute concerned with specialized training and health education aimed at changing public attitudes to the disease.—Author's Summary

Garfield, E. Leprosy: down but not out. Curr. Contents **37** (1980) 5–12.*

From a personal perspective the author reviews basic information about leprosy: its history, its psychosocial impact, its treatment, and areas of basic and clinical research into the disease. He points out that there are journals devoted almost exclusively to the subject of leprosy. "Most of the literature on leprosy research is published in the *International Journal of Leprosy and Other Mycobacterial Diseases*, *Leprosy Review*, *Infection and Immunity*, and *Bulletin of the World Health Organization*. The first-mentioned is the leading journal in the field, usually called *International Journal of Leprosy*. This journal, *Infection and Immunity*, and *Bulletin* are cov-

* Editor's Note: The field of leprosy as well as the JOURNAL are fortunate to receive this recognition in this widely-read publication.—RCH

ered by *Current Contents®/Life Sciences*. The *Bulletin of the WHO* is also covered by *Current Contents®/Clinical Practice*, as is *Leprosy Review*. All four journals are indexed in the *Science Citation Index®* (*SCI®*), and all except *Infection and Immunity* are selectively covered by the *Social Sciences Citation Index®*.

"It is unusual for a journal on as specific a subject as leprosy to have as high an impact as does the *International Journal of Leprosy and Other Mycobacterial Diseases*. The impact is a measure of how often the average article it publishes is cited. According to the 1978 *SCI Journal Citation Reports*, it ranked in the top third of the journals covered by the *Science Citation Index* that year. Even more impressive is the journal's ranking in terms of how quickly authors cite the articles it publishes. When the journals covered by ISI® in 1978 were ranked by immediacy—by the number of times their 1978 articles were cited in 1978—the *International Journal of Leprosy* appeared in the top 20 percent."

The essay concludes by describing centers for leprosy work and leprosy research both in the U.S.A. and worldwide.—(*Adapted from* the article)

Ree, G. H. Psychosomatics of leprosy. Papua New Guinea Med. J. **23** (1980) 41–45.

This is a well presented article on the psychological impact of leprosy on a patient, in general, and on the Papuan New Guinean patient, in particular. The article is subdivided into a number of specific topics in which the author discusses attitudes and social rejection, the word "leprosy," social reaction, isolation, health workers, involvement of genitalia, treatment, and rehabilitation. He emphasizes the fact that stigma varies widely throughout Papua New Guinea and that stigmatization is "largely a bigotry of educated people . . . ." He favors retention of the word "leprosy" since he feels that calling it Hansen's disease may, by implication of concealment, make matters worse.

There is much factual material on the disease itself and its treatment, and particular stress is put on the role of the health worker in the care and rehabilitation of patients. The article is particularly suited to the needs of the Papuan New Guinean health worker but could well be read by anyone with an interest in the disease and its social and psychological implications.—J. C. Hargrave

Chemotherapy

Acocella, G. and Conti, R. Interaction of rifampicin with other drugs. Tubercule **61** (1980) 171–177.

The available evidence on the interactions between rifampin and other drugs is reported and analyzed. Evidence of interaction with rifampin has been reported in the literature for cardiac glycosides (digitoxin, digoxin), oral contraceptives, anticoagulants (acenocoumarol, Warfarin®), narcotics and analgesics (methadone, morphine, phenobarbital), oral antidiabetics (sulfonylureas, biguanides), dapsone, corticosteroids, and cholephils (bilirubin, bromsulphthalein). This interaction appears to be on a basis of the ability of rifampin to cause proliferation of the smooth endoplasmic reticulum of hepatocytes and induction of the drug-metabolizing enzyme system. These effects of rifampin result in lowered blood concentrations of the companion drug and diminished effectiveness. The action to be taken to prevent interference with the desired therapeutic effect of a drug given with rifampin does not present any major deviation from sound, routine medical practice. With the exception of oral contraceptives, it is rarely necessary to discontinue giving a drug because of interaction with rifampin.—(*Adapted from* the article)

Balakrishnan, S. Fluorimetric screening of dapsone in urine for drug trials. Lepr. India **52** (1980) 245–248.

The DDS/creatinine ratios obtained by the colorimetric and fluorimetric methods for dapsone were compared in healthy controls, outpatients not claiming to have DDS treatment, and inpatients receiving DDS. The ratios by fluorimetric method were considerably lower in the untreated cases compared to the colorimetric method. Fluorimetric assay for dapsone in urine can be more advantageously and reliably used for the preliminary screening of dapsone in urine for drug trials.—Author's Summary

Balakrishnan, S. and Christian, M. Assessment of self administration of dapsone in urine. Lepr. India **52** (1980) 249–251.

Self administration of dapsone by 217 outpatients attending the field clinics in the Tindivanam Zone in Tamil Nadu was assessed by measurement of dapsone/creatinine ratios in urine. All the patients screened were on DDS 100 mg daily, most of them for 6 days and the rest for 3 or 4 days a week. The estimated irregularity of dapsone intake ranged from 15–25% in the three different areas of this zone. The implications of the findings are discussed .—Authors' Summary

David, H. L., Clavel, S., Clément, F. and Moniz-Pereira, J. Effects of antituberculosis and antileprosy drugs on mycobacteriophage D29 growth. Antimicrob. Agents Chemother. **18** (1980) 357–359.

The minimal inhibitory concentrations of antituberculosis and antileprosy drugs were determined for *Mycobacterium aurum*. The concentrations that reduced the final yield of bacteriophage D29R_1 by 50% and the time during the replication cycle at which the drugs completely inhibited phage production were estimated. The 50% inhibitory concentration/minimal inhibitory concentration ratios were close to 1.0 for clofazimine, colistin, rifampin, and streptomycin; these ratios were high for dapsone (diaminodiphenylsulfone) and isoniazid. Ethambutol (minimal inhibitory concentration 1.0 μg/ml) was without effect on viral growth.—Authors' Summary

de Bergeyck, E., Janssens, P. G. and de Muynck, A. Radiological abnormalities of the ileum associated with the use of clofazimine (Lamprene; B663) in the treatment of skin ulceration due to *Mycobacterium ulcerans*. Lepr. Rev. **51** (1980) 221–228.

During the course of treatment with clofazimine (Lamprene; B663) for skin ulceration due to *Mycobacterium ulcerans*, a female patient, aged 38, developed severe and persistent gastro-intestinal symptoms with diarrhea. These became most intense 9 months after starting the drug during which period the dosage had been 100 mg 3 times daily.

Barium meal examination of the gastrointestinal tract showed striking abnormalities of the small bowel, particularly ileum, consisting of alternating segments of constriction and dilation, coarsening of the mucosal folds, and circumscribed "polypoid" areas. Ileal loops were flexible but painful on palpation and compression.

On stopping clofazimine, the patient's abdominal symptoms and diarrhea subsided rapidly. The skin ulceration soon healed completely. Fourteen months after stopping the drug a repeat barium meal examination of the small bowel was normal.

Although not confirmed by laparotomy or intestinal biopsy, no infective, parasitic, or neoplastic cause was found for the intestinal symptoms and radiological abnormalities, and it is considered that they were closely associated with the ingestion of clofazimine. Other cases in the literature are reviewed in which it has been well established that clofazimine may crystallize out in human tissues, including the sub-mucosa of the bowel and intra-abdominal lymph nodes. This drug, which is of great value in the treatment of leprosy, should be used in other conditions with caution, especially if alternative treatment is available. In leprosy, a dose of 100 mg 3 times weekly has been found effective and acceptable. Doses higher than this should only be used under exceptional circumstances and for short periods of time.—Authors' Summary

Dutta, R. K. Clofazimine and dapsone—A combination therapy in erythema nodosum leprosum syndrome. Lepr. India **52** (1980) 252–259.

Clofazimine and dapsone combination is an effective regimen for the treatment of

ENL patients. The regimen not only controls the reaction but also promotes concurrent bacteriological improvement. The drugs are well tolerated and free from adverse effect in the doses used in this study.—Author's Summary

Dutta, R. K. Erythema multiforme bullosum due to dapsone. Lepr. India **52** (1980) 306–309.

Two cases of tuberculoid leprosy who developed erythema multiforme bullosum (EMB) due to dapsone (DDS) are reported. Burning and itching sensations were found to be the prominent prodromal symptoms. The patients gave a history of urticaria and bronchial asthma. Salient clinical features and further management of the cases by desensitization with slow induction to DDS under cover of steroids and antihistamines have been discussed.—Author's Summary

Ellard, G. A. Profile of urinary dapsone/creatinine ratios after oral dosage with dapsone. Lepr. Rev. **51** (1980) 229–236.

The ratios of the concentration of DDS plus its diazotizable metabolites to creatinine (D/C ratios) of successive urine samples collected after the ingestion of either single or consecutive daily doses of 100 mg DDS followed a pattern that was closely in accord with the hypothesis that once absorption is complete, the rate of elimation of DDS and its diazotizable metabolites falls exponentially at a rate similar to the decline in plasma DDS concentrations. Diuresis influenced D/C ratios to only a minor extent. The results obtained indicated the validity of determining dapsone compliance by determining D/C ratios of urine samples from either the individual patient or a group of patients self-administering their prescribed daily DDS medication, provided that the results obtained are compared with those achieved with fully supervised treatment.—Author's Summary

Gabrielli, M. and Gatti, F. Pigmentación por clofazimina. Leprología **21** (1979) 37. (in Spanish)

Dentro del variado arsenal terapéutico con que se cuenta para la enfermedad de Hansen L., sin lugar a dudas, la clofazimina ocupa un puesto primordial. Su beneficio clinico y bacteriológico comprobado por el Indice Bacteriológico e Indice Morfológico se acompaña de una evidente disminución en la frecuencia de los episodios reaccionales.

Carece de efectos tóxicos salvo trastornos ocasionales digestivos. La pigmentación inducida, es el precio a pagar por el beneficio de esta droga.—(*Adapted from* the article)

Girdhar, B. K., Sreevatsa and Desikan, K. V. Effect of single dose (1500 mg) rifampicin on infectivity of patients with lepromatous leprosy. Lepr. India **52** (1980) 359–365.

The effect of treatment with a single dose of rifampin (1500 mg) has been investigated in previously untreated lepromatous leprosy patients. A group of 14 cases was administered 1500 mg of rifampin in a single dose along with 100 mg dapsone (DDS) daily. A control group received only 100 mg DDS daily. The patients were followed up for a period of 24 weeks. The clinical, bacteriological, and results of mouse foot pad inoculations do not indicate a significant advantage to the addition of a single dose of rifampin to conventional therapy with DDS.—Authors' Summary

Hastings, R. C. Kellersberger Memorial Lecture 1979: Immunosuppressive/anti-inflammatory thalidomide analogues. Ethiop. Med. J. **18** (1980) 65–71.

Thalidomide is highly effective in the clinical management of erythema nodosum leprosum (ENL) occurring in lepromatous leprosy. Studies on thalidomide's mechanism of action in ENL suggest that there are two clinically relevant sites of action of the drug: inhibition of neutrophil chemotaxis and inhibition of IgM antibody formation. Twenty-three thalidomide derivatives have been screened for activity in *in vivo* models of these two steps involved in ENL, the late stages of carrageenan rat paw edema and IgM antibody-forming cells in mouse spleens after immunization with sheep erythrocytes. Structure-activity relationships show that teratogenicity is separable from immunosuppressant activity in these thalidomide derivatives. This raises the

hope that a nonteratogenic thalidomide analog can be found which will be clinically effective in ENL.—Author's Summary

Jayaraman, P., Mahadevan, P. R., Mester, M. and Mester, L. Inhibition of the incorporation of [^{3}H]DOPA *Mycobacterium leprae* by desoxyfructo-serotonin. Biochem. Pharmacol. **29** (1980) 2526–2528.

In five experiments desoxyfructo-serotonin inhibited the incorporation of [^{3}H]DOPA into *M. leprae*. If it can be proven that DOPA is an essential metabolite for *M. leprae* growing *in vivo*, the authors propose that desoxyfructo-serotonin might be useful in therapy.—(*Adapted from* the article)

Institute of Dermatology, Chinese Academy of Medical Sciences, Lei-Gong-Teng Cooperative Research Group of Fujian and Jiangsu Provinces. Clinical observation on Chinese herb Lei-Gong-Teng in treatment of lepra reaction. Acta Academiae Medicinae Sinicae **1** (1979) 70–74. (in Chinese)

The Chinese herb Lei-Gong-Teng (*Trigterygium wilfordii* Hook F.) and its extracts were used in the treatment of 284 cases of Type II lepra reaction. Complete remission of the reactional syndrome was observed in 257 cases (90.49%), improvement in 24 cases (8.46%), no change in two cases (0.7%), and deterioration in one case (0.35%). Results were comparable to those of thalidomide (a group served as a control) in rapid subsidence of erythema nodosum leprosum (ENL), a fall in temperature, relief of nerve pain, and fall in erythrocyte sedimentation rate.

Thirty-four cases of Type I lepra reaction received Lei-Gong-Teng. Improvement was observed in 32 cases (94.1%) and no change in two cases (5.9%). The average time of beginning improvement of erythema was 4.5 days, nerve pain was 6.3 days, edema was 3 days, and fever was 4 days. As we know, thalidomide is of no effect on these cases; therefore, in Type I lepra reaction Lei-Gong-Teng was probably shown to be superior to thalidomide.

The side effects of Lei-Gong-Teng were mainly limited to gastrointestinal distress and leukopenia. In the 205 cases of Type II lepra reaction that received Lei-Gong-Teng, 62 cases (30.24%) had gastrointestinal distress such as anorexia, vomiting, stomach burning, diarrhea, abdominal pain, etc. One hundred and ninety-five cases of Type II lepra reaction received Lei-Gong-Teng; leukopenia was observed in seven cases (3.6%) ($<4000/mm^3$). Thirty-four cases of Type I lepra reaction were treated with Lei-Gong-Teng; gastrointestinal distress was observed in 16 cases (47.1%). In the 22 cases of Type I lepra reaction that received Lei-Gong-Teng, leukopenia was observed in six cases (27.3%). After discontinuing the therapy, all side effects gradually subsided.

One hundred and thirteen cases of Type II lepra reaction were treated with thalidomide; 47 cases (41.6%) had side effects such as dizziness, drowsiness, constipation, dryness of the oral and nasal mucosa, diarrhea, epigastric pain, etc.

The side effects of the extracts of Lei-Gong-Teng (''104'', ''124'') were fewer than those of Lei-Gong-Teng herb.—Authors' Summary

Krishna Murthy, K. and Raja Babu, K. K. Toxic psychosis after accidental ingestion of dapsone. Review and case report. Lepr. India **52** (1980) 443–445.

A case of toxic delirious psychosis in a 5 year-old child after accidental ingestion of dapsone is reported, and relevant literature is reviewed. A suggestion is made for a detailed work on the pathological and metabolic effects of dapsone on the central nervous system.—Authors' Summary

Kumar, B. and Kaur, S. Clofazimine and vitiligo. Indian J. Dermatol. Venereol. Leprol. **46** (1980) 133–134. (Letter to the Editor)

Twenty-six patients with vitiligo irrespective of sex and age were treated with clofazimine 100 mg daily for 2 months and then on alternate days for another 3 months. None of the patients had taken any other treatment for vitiligo in the recent past, nor were they allowed any medication during the course of the present treatment.

Only two patients showed showed slight evidence of repigmentation, which was in

the perifollicular areas in some of the patches and did not proceed beyond the size of small specks. This was considered insignificant, not due to clofazimine, and was perhaps a part of the natural course of the disease. There was no response at all in the other patients.

All the patients developed a peculiar brownish, pinkish, and dusky hue after an average of 3 weeks, which gradually deepened up to the end of 6 weeks after which it remained stationary. All the patients developed ichthyotic lesions on the arms and legs, starting 5 weeks onwards, which persisted till the end of the therapy and shortly afterwards also. One patient developed abdominal discomfort and diarrhea.

The color of the skin gradually became lighter 4-6 weeks after stoppage of therapy, but in many it was still appreciably deep even after one year. The color was deeper in the vitiliginous areas as compared to normal skin and was definitely more marked in the exposed areas.

From the authors' experience, clofazimine has no role whatsoever in the treatment of vitiligo, the annoying pigmentary and dry skin changes apart.—(*Adapted from* the letter)

Lal, S. and Garg, B. R. Sulphone induced exfoliative dermatitis and hepatitis. Lepr. India **52** (1980) 302–305.

Exfoliative dermatitis associated with hepatitis has been previously reported in leprosy patients taking dapsone in daily dosage of 200 mg or more. This report concerns a 40 year-old female who developed exfoliative dermatitis and hepatitis 6 weeks after starting dapsone in daily dosage of 100 mg for treatment of leprosy. She responded dramatically to administration of corticosteroids.—Authors' Summary

Lal, S., Jaganath, C., Garg, B. R. and Paneerselvam, R. Secondary sulphone resistance in leprosy. Lepr. India **52** (1980) 299–301.

A case of secondary sulfone resistant lepromatous leprosy proven by mouse foot pad tests is reported from Pondicherry, India.—Authors' Summary

Pattyn, S. R. The strategy of leprosy treatment: A personal view. Ann. Soc. Belge Méd. Trop. **60** (1980) 253–262.

Professor Pattyn's special paper on leprosy treatment begins with a lucid and useful review of the state of the art in leprosy treatment. Dapsone monotherapy has two serious shortcomings: the necessity for long-term treatment and the appearance of dapsone resistance. Other drugs active against *M. leprae* have been discovered, and two, rifampin and clofazimine, are used widely. In the absence of controlled clinical trials, no one knows how to make the best use of the new drugs. The author suggests a number of more rational regimens to be evaluated in those centers able to do so through correct supervision and follow-up of patients so that after some years they might be more generally applied. Regimens proposed include various combinations of the two bactericidal drugs, rifampin and ethionamide (or prothionamide), and the essentially bacteriostatic drugs, dapsone and clofazimine. The point is made that it is mandatory that precise standardized regimens be applied nationally or regionally and that it be realized that in the absence of the necessary infrastructure to assure correct use of the new drugs, it is preferable to abstain from introducing them to avoid doing more harm than good.—RCH

Pattyn, S. R. and Van Loo, G. Combined chemotherapy against *Mycobacterium leprae* in the mouse. Ann. Soc. Belge Méd. Trop. **60** (1980) 291–295.

Dapsone, ethio- or prothionamide, thiacetazone, and streptomycin were tested alone or in combination in the proportional bactericidal test and by the kinetic method on dapsone sensitive and resistant *M. leprae* in the mouse foot pad. In no instance was any antagonistic effect observed. There was some synergism in the combination dapsone-ethionamide and combinations including streptomycin. Ethionamide administered 3 times weekly was inactive but was active when administered together with dapsone continuously. The addition of thiacetazone to any other drug or combination was practically without effect in the conditions tested.—Authors' Summary

Ramu, G., Sengupta, U. and Desikan, K. V. Influence of sulphone therapy on lepromin reaction. Lepr. Rev. **51** (1980) 207–214.

Sulfones administered in different doses were found to have a modulating effect on lepromin responses in TT and BT cases. Twenty-six cases of TT and BT leprosy were initially lepromin tested and included in the study. Eight cases were given orally 100 mg dapsone per day, and nine cases were administered a single injection of acedapsone 225 mg. After 4 weeks all cases were retested with lepromin. The treatment was subsequently reversed so that the patients who received acedapsone earlier were placed on dapsone and those who had dapsone earlier were administered acedapsone. After a further 4 weeks the lepromin tests were again repeated. It was found that skin reaction to lepromin was significantly enhanced by small doses of sulfone and was depressed, although not significantly, by larger doses. Therefore, dapsone in full therapeutic doses may be usefully employed from the beginning in TT and BT cases with due care. It is also hypothesized that chemoprophylaxis with acedapsone might possibly enhance CMI against leprosy if already present.—Authors' Summary

Ree, G. H. and Taylor, V. E. Do leprosy patients in Papua New Guinea take their dapsone? Papua New Guinea Med. J. **22** (1979) 145–147.

The authors undertook an investigation of 20 control subjects, 15 supervised inpatients, and 105 outpatients to test patient compliance. They used Ellard's DDS/creatinine ratio in urine specimens. Their results showed that approximately one-quarter of outpatients attending the leprosy clinic were not taking medication and expressed their concern on the emergence of drug resistance. However, owing to the terrain and difficulties attending outpatient treatment in a country such as Papua New Guinea, they recorded 75% patient compliance as a valuable contribution towards control.—J. C. Hargrave

Sharma, S. C., Narang, A. P. S., Kumar, B., Koshy, A., Datta, D. V. and Kaur, S. Drug metabolism in leprosy. Indian J. Med. Res. **71** (1980) 456–459.

The metabolism of antipyrine and chloramphenicol was studied in 11 leprosy patients and 12 control subjects. *In vivo* clearance of the drugs was observed after administering the test doses. The activity of drug metabolizing enzymes, i.e., aminopyrine demethylase and bilirubin UDP glucuronyl transferase was also estimated *in vitro* by obtaining a fresh liver tissue by biopsy. A significant increase in the half-life of both the drugs was noted in patients with leprosy. Similarly, a significant decrease was observed in drug metabolizing enzymes, as compared to the controls.—Authors' Summary

Theophilus, S. Treatment with thalidomide in steroid dependency and neuritis. Lepr. India **52** (1980) 423–428.

Thalidomide is found effective and useful in cases of lepromatous ENL in corticosteroid dependent cases which had been on treatment with dapsone and clofazimine, but eventually, due to recurrence, these cases had to be put back on steroids because of easier availability. Cases of neuritis responded much more satisfactorily, and there was no change in the muscle deficit before or after treatment with thalidomide.—Author's Summary

Tomecki, K. J., Charles, J. and Catalano, C. J. Dapsone hypersensitivity. Arch. Dermatol. **117** (1981) 38–39.*

A hypersensitivity to a low dose (50 mg) short-term dapsone administration developed in a 16 year-old girl. The reaction included fever, malaise, dermatitis, jaundice with hepatic dysfunction, lymphadenopathy, and hemolytic anemia. Physicians

* Editor's Note: This patient developed symptoms 1 week after starting 50 mg dapsone daily for acne vulgaris. The dapsone was discontinued, the patient treated with prednisone, and she improved. The authors feel that: "Although the differential diagnosis was lengthy, the most likely diagnosis was a sulfone syndrome with hepatitis, secondary to dapsone." As always, in the absence of a past history of similar hypersensitivity reactions and in the absence of re-challenge with the drug, the diagnosis is not definite by any means.—RCH

should be familiar with this "sulfone syndrome," an uncommon, potentially serious side effect of dapsone therapy.—Authors' Summary

Venkatesan, K., Bharadwaj, V. P., Ramu, G. and Desikan, K. V. Study on drug interactions. Lepr. India **52** (1980) 229–235.

Studies on the interactions of drugs used in combination therapy of leprosy were attempted at this Institute. INH supplementation with clofazimine therapy appeared to lower the skin levels of clofazimine, raising the plasma and urinary content of clofazimine. Concurrent administration of clofazimine with DDS does not appear to exert any influence on the excretion of DDS. The plasma DDS lowering effect of rifampin does not vary between fast and slow acetylators for DDS.—Authors' Summary

Wilkinson, F. F. and Gervasi, V. Estudio bioquímico de pacientes con lepra lepromatosa tratados con rifampicina y 2-mercaptopropionilglicina. Leprología **21** (1979) 53–56. (in Spanish)

Los enfermos con lepra lepromatosa tienen varios factores de compromiso hepático. El primero de éstos es la hepatopatía propia de la enfermedad. El segundo, no por ello menos importante, es la hepatotoxicidad de los medicamentos empleados en su terapéutica. En nuestro estudio se ensayó la asociación de un hepatoprotector eficaz como la 2-mercaptopropionilglicina en pacientes con lepra lepromatosa tratados con rifampicina. El examen clinico permitió corroborar luego de 4 meses de tratamiento una mejoría en el más del 65% de los casos. La evalución bioquímica de diversas variables hepatocelulares permitió corroborar una mejoría en el 80% de los casos. Estos alentadores resultados nos permiten concluir que la 2-mercaptopropionilglicina es una medicación útil en pacientes con lepra lepromatosa tratados con rifampicina con el objeto de mejorar la tolerancia a esta medicación y disminuir sus efectos hepatotóxicos.—(*Adapted from* the article)

Wilkinson, F. an ! Liturri, M. Rifampicina asociada a levamisol, en doble ciego en pacientes de lepra lepromatosa. Leprología **21** (1979) 48–52. (in Spanish)

Cuarenta enfermos de lepra lepromatosa fueron sometidos a un tratamiento con rifampicina-levamisol (20 casos) y rifampicina-placebo (20 casos) en un tratamiento a doble-ciego durante seis meses, controladis clínicamente y con histopatología, baciloscopía, lepromina reacción, análisis de laboratorio y frecuencias de reacción leprótica, llegando a la conclusión que las mejorías sintomatológicas alientan a continuar la investigación.—Authors' Summary

Clinical Sciences

Akhtar, M., Ali, M. A. and Mackey, D. M. Lepromatous leprosy presenting as orchitis. Am. J. Clin. Pathol. **73** (1980) 712–715.

Two patients with lepromatous leprosy presenting initially because of lepromatous orchitis are reported. These cases are unusual because they were diagnosed as lepromatous orchitis at a stage when no other evidence of leprosy was present. Generalized skin lesions characteristic of lepromatous leprosy subsequently developed in one of these patients. It is suggested that lepromatous orchitis should be actively considered in the differential diagnosis of orchitis and infertility.—Authors' Summary

Albert, D. A., Weisman, M. H. and Kaplan, R. The rheumatic manifestations of leprosy (Hansen's disease). Medicine **59** (1980) 442–448.

Leprosy is a rare disorder in the United States yet the rheumatic features of the disease appear to be common and frequently are the primary complaint. We observed rheumatic syndromes or erythema nodosum leprosum (ENL) occurring with and

without arthritis, a swollen hands syndrome, cutaneous vasculitis, or myositis in the majority (15 of 21) of our patients. These syndromes were distinctive, sometimes dramatic, and appeared to "mimic" idiopathic rheumatic diseases, substantially delaying an accurate diagnosis of leprosy in some patients. These complications were the major cause of morbidity in our 21 patients and became dominant clinical problems requiring additional chemotherapy.—Authors' Summary

Bhagat, K. P., Wange, H. M. and Tekani, B. U. Management of nerve abscesses in leprosy. Indian J. Dermatol. Venereol. Lepr. **46** (1980) 110–112.

Nineteen cases of ulnar nerve abscess were subjected to evacuation and later on to extraneural decompression with medical longitudinal epineurotomy. Excellent sensory recovery was seen more in the younger than in the older age group. Evacuation of abscess and extraneural and intraneural decompression reduces the pressure effects of nerves, and recovery is seen which can be explained on the basis of increased vascularity, post-operatively.—Authors' Summary

Bharadwaj, V. P., Sritharan, V., Venkatesan, K., Ramu, G. and Desikan, K. V. Effect of DDS therapy on blood pyruvate and lactate levels in leprosy patients. Lepr. Rev. **51** (1980) 237–241.

A study was undertaken with an aim to find out if DDS could have any effect on the thiamine levels of leprosy patients. Cases of lepromatous leprosy with and without neuritis were the subjects of this study. Pyruvate tolerance test was done in the blood of these patients before and after DDS treatment; blood pyruvate and lactate estimations were done. LL with neuritis gave significantly decreased pyruvate tolerance, and the lactate/pyruvate ratio was significantly less than in the controls and lepromatous patients without neuritis. This may be indicative of a subnormal status of thiamine in these patients. DDS treatment of these cases resulted in further enhancement of pyruvate values, probably indicating a progressive thiamine deficiency. Those patients who were on prolonged treatment, however, showed near normal values. It is suggested that DDS may cause derangement in pyruvate and lactate metabolism, which, however, needs further work to understand the underlying mechanism of this phenomenon.—Authors' Summary

Bloom, B. R., Convit, J., Godal, T., Noordeen, S. K., Perkins, F. T., Rees, R. J. W., Sansarricq, H., Shepard, C. C., Torrigiani, G. and Walter, J. Recommended safety requirements for the preparation of lepromin: a WHO memorandum. Bull. WHO **57** (1979) 921–923.

The need for standardizing the preparation of lepromin and establishing safety requirements for it was recognized by the Scientific Working Group on the Immunology of Leprosy (IMMLEP) and its Steering Committee in 1978. It has now recommended the preparation of standard integral (Mitsuda-type) lepromin and, in collaboration with the WHO Biologicals Unit, has drafted requirements for its preparation and testing. These direct that the source material should be *Mycobacterium leprae* from biopsy specimens of skin obtained from human (lepromatous) tissues or from the tissues of armadillos infected with *M. leprae*. The procedures to be followed for processing and testing the source material and for the preparation of lepromin from it are described. Requirements are laid down for the safety testing and labelling of the final product. In the future, IMMLEP will consider supporting only those projects involving the use of lepromin prepared in accordance with these regulations.—Authors' Summary

Debi, B. P., Mohanty, H. C., Tripathy, N., Tompe, D. B. S. and Sarangi, B. K. Arteriographic pattern of plantar ulcers in lepromatous leprosy—Study of 20 cases. Lepr. India **52** (1980) 429–432.

Sixty arteriograms were done in 20 cases of lepromatous leprosy with 35 plantar ulcers of 6 months to 2 years duration. Tortuosity, narrowing, and obliteration of vascular lumen were mostly observed. Obliteration of vascular lumen was seen in 25% of cases. Arteriographic findings were directly proportional to the age of the pa-

tient and the duration of the ulcer. Hyperemia and neovascularization were seen in active and infected ulcers. Advanced vascular changes were associated with osteolytic changes of the bone along with neurological deficit.—Authors' Summary

Gupta, J. C. and Panda, P. K. Amyloidosis in leprosy. Lepr. India **52** (1980) 260–266.

Fourteen hundred and forty-five biopsied tissues of various organs including liver, skeletal muscle, kidney, lymph node, larynx, and skin from 1222 patients with leprosy obtained during the last 10 years have been examined histopathologically to study various types of pathological lesions. These patients ranged in age from 7 to 72 years, and the duration of the illness varied from fewer than one to twenty years. Although the presence of lepromatous granulomas, AFB in varying proportions, and some nonspecific lesions have been observed, amyloidosis was not detected in any of them. This finding is discussed in view of the observations of other authors from different parts of the world. Consumption of a mainly vegetarian diet in our population and that of meat in the Western population has been suggested as the probable cause of the difference in amyloidosis observed in the two groups of people.—Authors' Summary

Gupta, J. C., Gandagule, V. N., Nigam, J. P. and Gupta, D. K. A clinico-pathological study of laryngeal lesions in 30 cases of leprosy. Lepr. India **52** (1980) 557–565.

The histological findings in laryngeal biopsies and local clinical findings in 30 cases of leprosy have been reported in detail. It is emphasized that in areas where there is significant incidence of leprosy, laryngeal involvement may be expected even in the absence of local clinical manifestations and be confirmed by histological examination and demonstration of acid-fast bacilli. Further, histological appearance may not be very characteristic at the outset. The observations made by previous authors have been reviewed and discussed.—Authors' Summary

Kaur, S., Kumar, B., Darshan, H. and Singh, S. Choice of skin slit smears for study of bacterial and morphological indices. Lepr. India **52** (1980) 540–547.

Skin slit smears of 46 patients with lepromatous leprosy (16 untreated, 30 long treated) were studied from ear lobules, fingers, elbows, and knees. In untreated patients ear lobules gave the highest BI compared to other sites. The MI from ear lobules was higher than the elbows and knees but slightly lower than that from fingers. In treated patients, sites other than ear lobules yielded solid staining bacilli more frequently. Multiple sites and especially peripheral sites are recommended for study of skin slit smears to discover persistent bacilli.—Authors' Summary

Kumar, B., Kaur, S., George, T., Chakravarty, R. N. and Ganguly, N. K. Serum lipids in leprosy. Lepr. India **52** (1980) 433–439.

Sera of 58 patients with various types of leprosy were tested for total fat, phospholipids, cholesterol, and alpha and beta lipoproteins. Total fat and both fractions of lipoproteins were found to have values comparable to normals in all types of leprosy. Serum phospholipid levels were significantly reduced in the LL type of leprosy compared to normals and the TT group of patients. Similarly, cholesterol levels were found to be significantly reduced in the LL group compared to normal controls.—Authors' Summary

Kumar, B., Singh, S. and Kaur, S. Jaundice occurring as a complication of erythema nodosum leprosum (a report of two cases). Lepr. India **52** (1980) 586–590.

Two patients with lepromatous leprosy who developed jaundice during erythema nodosum leprosum are reported here. There was slight enlargement of the liver and transient change in liver functions during the acute phase, which subsided after subsidence of reaction. Histopathology and other details are described.—Authors' Summary

Kumar, R., Vaidya, M. C. and Belurkar, N. Blood levels of serotonin in human leprosy. Lepr. India **52** (1980) 532–535.

Blood levels of serotonin were deter-

mined in 40 lepromatous leprosy patients. Lepromatous patients showed significantly higher serotonin blood levels than normal controls. Highly infective lepromatous patients had higher values than noninfective patients.—(*Adapted from* the article)

Lang, W. R. Leprosy in Auckland. NZ Med. J. **92** (1980) 271–275.

The purpose of this article was to alert physicians that leprosy does exist in New Zealand, that it is found largely among immigrants from the Polynesian islands and that treatment compliance is frequently poor; additionally, the article attempts to educate doctors in the recognition of leprosy. The author comments on a survey of 45 cases, describes typical case presentations, and briefly discusses treatment and difficulties in leprosy control in New Zealand. The article is clear, precise, and could well be presented in journals in other countries where leprosy is uncommon. It draws attention to the important points a general practitioner should be aware of and also provides sufficient background information on pathology and immunology to make the disease readily understood by a total stranger to the disease.—J. C. Hargrave

Moulopoulos, S. D., Diamantopoulos, E. J., Adamopoulos, P. N. and Anthopoulos, L. P. Epidemiology of coronary artery disease among Hansen's patients. Angiology **31** (1980) 82–90.

The prevalence of coronary heart disease (CHD) and its risk factors were studied in 475 Hansen's patients (HP's) by a special questionnaire, physical examination, electrocardiogram at rest and after exercise, and biochemical and hematologic investigations. It was found that the prevalence of CHD (Minnesota codes 1-1 to 1-3 and 4-1) was 10.92%, which is higher than that found in epidemiologic studies of non-Hansen populations. The only CHD risk factors detected were age, obesity, and hypertension. There was no statistically significant difference in the prevalence of CHD between HP's living confined in the institution and those living in their homes. Factors enhancing the development of CHD in this group may include hypertension and obesity as well as psychological factors, which are particularly common in these patients and, of course, in old age.—Authors' Summary

Naik, S. S. and Gurnani, S. Serum lysozyme in leprosy. Lepr. India **52** (1980) 501–507.

Serum lysozyme was assessed in 43 healthy subjects and 183 leprosy patients. Significantly elevated levels of lysozyme were observed in sera of leprosy patients compared to normal individuals. The enzyme levels in leprosy of different types showed elevations in the following order: erythema nodosum leprosum (ENL) > lepromatous > borderline > tuberculoid. Enzyme levels in patients with inactive stage were lower than in untreated patients. The serum lysozyme level correlated well with the activity of disease in leprosy, clinically and bacteriologically. Thus the estimation of serum lysozyme can be used as one of the parameters of activity of the disease.—Authors' Summary

Parvez, M., Sharda, D. P., Jain, A. K., Bhargava, N. C. and Misra, S. N. A study of serum protein in leprosy. Lepr. India **52** (1980) 374–382.

Total serum protein albumin, globulin, and A/G ratio were determined in 50 patients with different types of leprosy and 15 healthy controls. A significant elevation of total serum proteins ($p < 0.001$) was observed in 25 patients with lepromatous leprosy and ten patients with lepra reaction. No statistically significant alteration in total serum protein ($p < 0.05$) was observed in 15 patients with non-lepromatous leprosy.

A significant fall in serum albumin with a concomitant rise in serum globulin level ($p < 0.001$) was observed in non-lepromatous leprosy, lepromatous leprosy, and patients having lepra reactions.—Authors' Summary

Robins, K., Vijayakumar, T., Gopinath, T. and Vasudevan, D. M. Liver in leprosy. I. Functional changes. Lepr. India **52** (1980) 416–422.

Liver function tests were carried out in 79 leprosy patients of whom 28 patients were being treated and 42 patients were not

receiving any treatment. The remaining nine patients were clinically quiescent. In the untreated group there were 28 tuberculoid and 14 lepromatous cases. The 28 patients receiving treatment were composed of an equal number in the lepromatous and tuberculoid groups. The liver function tests of ten of the untreated tuberculoid patients were repeated after six months of specific therapy with DDS. The values of liver function tests of these patients were compared with those of 20 normal adults. The most important abnormality observed in the patients was a reversal of albumin/globulins ratio, which was more common in the lepromatous than in the tuberculoid group. Treatment with DDS resulted in a reduction of the serum globulin. There were no changes in transaminases and alkaline phosphatase activities in the untreated patients. However, a rise in these enzymes was observed in patients on treatment. The mean serum cholesterol values of the patients were lower than those of the controls.—Authors' Summary

Smith, W. C. S. Tetanus infection in patients with leprosy. Lepr. India **52** (1980) 536–539.

The incidence of death from tetanus in leprosy patients has been compared with the general population. It appears that tetanus occurs less often among leprosy patients. The pathogenesis and consequences of this are discussed.—Author's Summary

Wahba, A., Dorfman, M. and Sheskin, J. Psoriasis and other common dermatoses in leprosy. Int. J. Dermatol. **19** (1980) 93–95.

The medical records of all 309 leprosy patients who have been under the care of the Government Hospital for Hansen's disease in Jerusalem, Israel during the last 30 years were surveyed. None of the patients showed clinical evidence of psoriasis on numerous examinations conducted during periods of follow-up of up to more than four decades. If this finding proves to be reproducible also in other groups of leprosy patients in other regions of the world, this would suggest that psoriasis is very rare among leprosy patients and that psoriatic subjects might have a natural protection against the development of leprosy. This could possibly be explained as the result of the hyperactivity of the reticuloendothelial and phagocytic systems, which seems to be an integral part of the psoriatic constitution.—Authors' Summary

Immuno-Pathology

Ghei, S. K., Sengupta, U. and Ramu, G. Phytohaemagglutinin (PHA)-induced transformation of peripheral blood lymphocytes in leprosy patients. Lepr. India **52** (1980) 223–228.

One-hundred-one patients with different types of leprosy were investigated for PHA-induced lymphocyte transformation in peripheral blood. There was a significant depression ($p < 0.05$) in blastogenesis in borderline (BB), borderline lepromatous (BL), and lepromatous (LL) patients. On the other hand, tuberculoid (TT) and borderline tuberculoid (BT) patients did not show any alteration in PHA-induced blastogenesis ($p > 0.05$) when compared to normals. The significance of these findings is discussed.—Authors' Summary

Katoch, V. M., Mukherjee, A. and Girdhar, B. K. A bacteriological and histopathological study of apparently normal skin in lepromatous leprosy. Lepr. India **52** (1980) 508–512.

A comparative study of clinically affected and apparently uninvolved skin in lepromatous patients has been undertaken in 22 cases. Parameters studied include skin smears for Bacillary Index: bacillary load/gm of tissue and histopathological comparison of granuloma fraction and biopsy index. The results showed that the clinically unaffected sites have a lower bacillary index and lesser bacterial load. Histologically, the granulomas were smaller and the biopsy index was lower in uninvolved areas. The possible reasons for this com-

paratively lesser involvement are discussed.—Authors' Summary

Kotteeswaran, G., Chacko, C. J. G. and Job, C. K. Skin adnexa in leprosy and their role in the dissemination of *M. leprae*. Lepr. India **52** (1980) 475–481.

Skin biopsies from 20 patients each with tuberculoid, borderline, and lepromatous leprosy were studied with a view to finding the presence of bacilli in sweat glands, sebaceous glands, hair follicles, and arrector pili muscles and also the pattern of destruction of these tissues by leprous granulomas.

M. leprae are found in large numbers in sweat glands, sweat ducts, sebaceous glands, hair follicles, and arrector pili muscles. Further, in lepromatous leprosy the granulomas mainly surround the skin adnexa, which atrophy due to pressure by the granuloma. However, in tuberculoid leprosy, the inflammatory cells infiltrate the adnexal tissues and destroy them. This study confirms that *M. leprae* are discharged and disseminated through sweat and sebaceous secretions, and therefore infection through skin to skin contact can be one of the common modes of transmission of the disease.—Authors' Summary

Kumar, B., Ganguly, N. K., Kaur, S., Sharma, S., Chakravarty, R. N. and Mahajan, R. C. Complement profile in leprosy. Lepr. India **52** (1980) 217–222.

Serum complement levels of CH 50, C1q, C′ 3, and C′ 4 were studied in 62 patients with various types of leprosy. CH 50 and C′ 3 levels were found to be normal in lepromatous leprosy (LL) but elevated in LL with erythema nodosum leprosum (ENL) patients. Values of C′ 3 and CH 50 were low in borderline lepromatous (BL) patients. C1q values were elevated in LL, LL with ENL, and BL categories of patients. C′ 4 levels were unchanged in every type of leprosy. Serial studies were done in five patients with LL and ENL, who were followed over a period of 4 months.—(*Adapted from* authors' summary)

Kumar, B., Kaur, S. and Ganguly, N. K. Assessment of diluted Dharmendra antigen. Lepr. India **52** (1980) 482–490.

Twenty-one patients of the lepromatous and tuberculoid types were tested with standard 1:2 and 1:4 diluted Dharmendra lepromin. It was found that a correlation exists between the degree of induration and the number of bacilli in the lepromin. Uniform and reproducible results were obtained with Dharmendra antigen containing 40 million bacilli/ml. This is of special significance in enhancing the present meager supplies of lepromin.—Authors' Summary

Kumar, B., Kaur, S., Ganguly, N. K. and Sharma, S. Cutaneous responses to antigens and irritants in patients of leprosy. Lepr. India **52** (1980) 405–410.

Forty-seven patients with various types of leprosy were skin tested with PPD, Dharmendra lepromin, DNCB, coccidiodin, histamine, and croton oil. Twenty-five age matched normal controls were also included in the study. All types of leprosy patients reacted in smaller numbers and with decreased response to all antigens and irritants compared to normal controls. Depression of response was minimal in the tuberculoid and maximal in the lepromatous group. None of the patients or controls reacted to coccidiodin. Further details are given.—Authors' Summary

Lawrence, D. N., Bodmer, J. G. and Bodmer, W. F. Distribution of HLA antigens in Ticuna Indians of Brazil: Results of typing a leprosy-affected family. Tissue Antigens **16** (1980) 152–160.

HLA typing was performed in 1978, using antisera recognizing specificities defined by the Seventh Workshop, on lymphocytes separated and frozen in the field during a 1976 expedition among Amazonian Ticuna Indians. Family segregation of HLA antigens was used to ascertain haplotypes of a sample of essentially unrelated reproductive-age adults. "Expaternal" haplotypes were also included in the total of 81 haplotypes used for calculating the A and B locus gene frequencies.

Common A and B locus antigens among the Ticuna were Aw24, Aw31, A2, Bw39, B40, Bw35, and B15.1. Bw52 and Bw53 were also present. No A or B locus "blanks" were found. A slight degree of

European admixture was apparent. Bw16-reactive cells from certain persons consistently failed to react with Oxford antisera capable of recognizing the Bw38 or Bw39 subspecificities. Cw1 and Cw3 were found in association with typical South American Indian haplotypes. The results of HLA typing of a large extended family with multiple cases of leprosy are depicted and compared to recently reported family studies of leprosy.—Authors' Summary

Mathias, C., Chacko, C. J. G., Sundar Rao, P. S. S. and Job, C. K. T-cell depletion of spleen in patients with longstanding lepromatous leprosy. Lepr. India **52** (1980) 366–373.

In eight autopsied lepromatous patients the spleen was examined histopathologically, and their differential cell population was counted in subcapsular area, red pulp, and white pulp. There was considerable reduction of lymphocytes and a well marked increase in macrophages and plasma cells in the thymus dependent white pulp. In the subcapsular area and the red pulp, although there was an increase in plasma cells and macrophages, no significant reduction of lymphocytes was recorded. Therefore, it is suggested that in lepromatous leprosy there is a selective reduction in the number of T lymphocytes.—Authors' Summary

Melson, R., Duncan, M. E., Harboe, M. and Bjune, G. Antibodies against *Mycobacterium leprae* antigen 7 from birth to 18 months of age: an indicator of intra-uterine infection in leprosy. Clin. Exp. Immunol. **42** (1980) 107–113.

All babies of three nonleprosy mothers and ten tuberculoid leprosy mothers and four of five babies of mothers with inactive lepromatous leprosy showed a decline in serum concentrations of antibodies against *M. leprae* antigen 7 during the first 4 months of life, as expected from catabolism of maternal IgG. By contrast, ten of 20 babies of mothers with active lepromatous leprosy showed a decline in concentration of anti-*M. leprae* 7 antibodies considerably less than expected. This indicates that these babies have been stimulated by *M. leprae* antigen 7 either as a free antigen or by viable *M. leprae* before birth and thus that leprosy may occur as a congenital infection. Studies of anti-*M. leprae* antibodies in repeated serum samples obtained during the first 18 months of life indicated that children of mothers with bacilliferous leprosy are frequently exposed to *M. leprae* to a sufficient extent to stimulate the immune system of the baby to production of anti-*M. leprae* antibodies during this period. The consequences of this exposure to *M. leprae* should be ascertained by careful clinical studies.—Authors' Summary

Misra, R. C. Leprous histiocytoma. Lepr. India **52** (1980) 582–585.

An apparently healthy male aged 18 years presented with four subcutaneous swellings. He had no history of leprosy, and he did not receive any treatment for leprosy. Histological examination of one of the swellings revealed leprous histocytoma. The histological features of the lesion have been discussed and available literature reviewed.—Author's Summary

Nath, I. and Singh, R. The suppressive effect of *M. leprae* on the *in vitro* proliferative responses of lymphocytes from patients with leprosy. Clin. Exp. Immunol. **41** (1980) 406–414.

Peripheral blood lymphocytes from 60 leprosy patients and eight healthy contacts known to be responsive to *M. leprae* were stimulated *in vitro* with concanavalin A (Con A) or PPD alone or in combination with autoclaved, whole *M. leprae*. Time kinetics and the percentage of inhibition induced by *M. leprae* differed in the two disease groups and contacts. Antigen-generated suppression of Con A-stimulated lymphocyte transformation was observed on day 4 in 17 of 21 (80%) tuberculoid patients and 6 of 17 (35.3%) untreated lepromatous patients. Healthy contacts and 53% of the lepromatous individuals showed enhanced Con A responses in the presence of antigen. On prolongation of antigen presence to six days, a marginal effect was noted in the tuberculoid group. In contrast, all healthy individuals and some lepromatous patients showed increased inhibition of Con A responses. *M. leprae* antigens showed uniform inhibition of PPD-induced ^{3}H-thy-

midine incorporation in leprosy patients and healthy contacts.—Authors' Summary

Nath, I., van Rood, J. J., Mehra, N. K. and Vaidya, M. C. Natural suppressor cells in human leprosy: the role of HLA-D-identical peripheral lymphocytes and macrophages in the *in vitro* modulation of lymphoproliferative responses. Clin. Exp. Immunol. **42** (1980) 203–210.

Six families with HLA-D-identical siblings suffering from leprosy were studied. Lymphocytes and macrophages isolated from the peripheral blood were co-cultured with allogeneic, HLA-D-identical cells and stimulated with *M. leprae* antigens and concanavalin A. Tuberculoid patients had circulating lymphocytes which showed marked functional suppression of lymphoproliferative responses to antigen and mitogen. In contrast, lepromatous patients showed weak lymphocyte suppressor activity. Macrophages derived from responder individuals augmented while those derived from lepromatous patients inhibited *M. leprae*-induced proliferation of lymphocytes.—Authors' Summary

Navalkar, R. G. Immunology of leprosy. CRC Crit. Rev. Microbiol. **8** (1980) 25–47.

This review presents and discusses some current concepts of the relationship between the clinical and immunological parameters of the disease and assesses the aberrations of the immune system found in leprosy patients, particularly those in the advanced stages of infection. The author outlines current thinking on the immunology of leprosy by discussing the clinical spectrum of leprosy, lepromin skin testing, serological profiles in leprosy, immunoglobulin studies in leprosy, humoral antibody responses, immune complexes and cell-mediated immunity in *M. leprae* infection, the immune responses in various experimental animal models, and concludes the review with attempts at immunotherapy in leprosy. The review is extensive (145 references) and scholarly. It provides a comprehensive and useful overview for the careful student of this disease.—RCH

Piva, J. R. and de Perez Nardini, S. Algunas observaciones en ganglios linfaticos de pacientes lepromatosos. (Some observations on lymph node disorders in lepromatous patients.) Leprología **21** (1979) 26–31. (in Spanish)

The authors demonstrate some of the lymph node disorders which can be seen in patients suffering from lepromatous leprosy and which can be pathophysiologically related to some aspects of the disease. Cases with a large number of Virchow cells are excluded, and they are labeled as "typical." These four groups presented do not represent all the pathologic forms expressed in lymph node tissue but summarize, in the light of the authors' experience, characteristic patterns that can be grouped.—Authors' Summary

Rampure, A. M. and Bhargava, M. K. Wade's histoid lepromatous leprosy. Indian J. Pathol. Microbiol. **22** (1979) 89–92.

A histopathological study of 92 cases of leprosy, 73 treated and 19 untreated, was undertaken. There were 36 lepromatous leprosy (34 treated and two untreated) patients. Two of these showed histomorphological features of the histoid variant of lepromatous leprosy. These two cases are reported here with a brief review of the literature, including a discussion of the possible histogenetic pathway of the lesion.—Authors' Summary

Ratnam, A. V. Advances in dermatology: 1—Leprosy immunology. Med. J. Zambia **13** (1979) 76–78.

The article is a brief review of modern day concepts on the immunology of leprosy. The article describes the accepted immunologic basis for the Ridley-Jopling classification, the mechanisms of reactions occurring in leprosy, and current approaches to treatment. The article concludes that the prolonged course of leprosy over many years and the primary skin involvement of the disease allow an observer to benefit from a unique telescopic view of the slow motion of events of immunological warfare in the disease and points out that

leprosy serves as an effective model for research in other diseases such as tuberculosis, leishmaniasis, and many others in which cell-mediated immunity plays a vital role in the control of the infection.—(*Adapted from* the article)

Sachdev, K. N., Mathur, D. R. and Chawla, S. N. Status of circulating "T" lymphocyte population in leprosy. Lepr. India **52** (1980) 383–389.

"T" lymphocyte population was estimated in 40 cases of various types of leprosy by the E-rosette formation. The mean percentage value of "T" lymphocyte was significantly low in the lepromatous group as compared to the tuberculoid and borderline leprosy. The mean percentage population of "T" lymphocyte was also compared with 24 normal healthy control cases, and significantly low levels were observed in all types of leprosy. The population of "T" lymphocytes was also correlated with tuberculin tests in leprosy patients and healthy control cases. The lowest count of "T" lymphocyte population and the smallest diameter of erythema were observed in lepromatous leprosy, suggesting impaired cell-mediated immunity in this group.—Authors' Summary

Sanabria Negrin, J. G., Kouri Flores, J. B., Fernandez Baquero, G., Hernandez Angulo, M. H. and Fraguela Rangel, J. Lepra lepromatosa subpolar: Estudio hístico y ultraestructural de un caso. (Subpolar lepromatous leprosy: A histologic and ultrastuctural study of a patient.) Rev. Cub. Med. Trop. **31** (1979) 89–96. (in Spanish)

Leproma material from a female patient with a previous diagnosis of lepromatous leprosy underwent clinical, histopathological, and electron microscopic studies. Following a year of rifampin treatment, it was found that the histologic lesions corresponded to those described by Ridley (1974) within the clinical picture of regressive subpolar lepromatous leprosy. Electron microscopic studies of the cells composing the lesions were conducted; their ultrastructural appearance does not markedly differ from that reported for the polar form except regarding the lack of acid phosphatase reaction for the giant multinucleated and vacuolated cells.—Authors' Summary

Shepard, C. C., Draper, P., Rees, R. J. W. and Lowe, C. Effect of purification steps on the immunogenicity of *Mycobacterium leprae*. Br. J. Exp. Pathol. **61** (1980) 376–379.

In studies aimed at the development of an antileprosy vaccine for use in man, *Mycobacterium leprae* suspensions were prepared from livers of experimentally infected armadillos. The two methods of purification in chief use, carried out after irradiation of the tissue with 2.5 megarads of gamma irradiation from ^{60}Co, involved treatment with 0.1 N NaOH for 2 hr at room temperature, trypsin, and chymotrypsin digestion for 24 hr at 37°C, and separation in a two phase liquid polymer (dextran:polyethylene glycol) system. All vaccines were autoclaved and injected intradermally in mice. Earlier studies have shown that heat inactivation does not interfere with the immunogenicity of *M. leprae*. Immunogenicity was measured by foot pad enlargement (FPE) after challenge with heat-killed *M. leprae* suspensions or by protection against infectious foot pad challenge. The results indicated that the irradiation and two-phase separation did not decrease immunogenicity, but the NaOH treatment and enzyme digestion did.—Authors' Summary

Sivamani, S., Garg, B. R. and Lal, S. Leucocyte migration inhibition test in leprosy patients across the spectrum of leprosy. Lepr. India **52** (1980) 527–531.

The leukocyte migration inhibition test (LMIT), using Dharmendra antigen, was performed in 21 cases of leprosy classified according to the Ridley-Jopling scale (1966). The degree of migration correlated well with the classification as expected, thus confirming the immunological validity of the Ridley-Jopling classification.—Authors' Summary

Sun Zhen-De. *In vitro* study of the effects of home-made porcine thymosin on cellular immunity in leprosy patients—T cell responses. Communications on Research

of Prophylaxis and Therapeutics in Dermatology **9** (1980) 6–8. (in Chinese)

The response of peripheral leukocytes from 63 leprosy patients of various types to domestically made porcine thymosin was investigated *in vitro* by employing total E-rosette, active E-rosette, and lymphocyte blast transformation tests. The lymphocyte blast transformation tests were performed using a double label with tritium labeled thymidine and ^{14}C-uridine. The results showed: 1) the number of active E-rosettes was decreased in the peripheral blood of leprosy patients near the lepromatous end of the spectrum. The peripheral lymphocytes in these patients responded to thymosin *in vitro*; 2) immunotherapy with thymosin might be helpful in the leprosy patients; 3) there may be a certain number of immature lymphocytes in the circulating blood of these patients.—Author's Summary

Tarabini-Castellani, G., Tarabini-Castellani, G. L. and Nuti, M. I. Resultados del lepromin test utilizando lepromina humana (H) y lepromina de armadillo (A) (+). (I. Results of the lepromin test using human (H) and armadillo (A) (+) lepromins.) Rev. Fontilles **22** (1980) 621–634. (in Spanish)

The authors have compared the degree of response to armadillo-derived lepromin (A) and human lepromin (H) in 35 leprosy patients, 14 household contacts of leprosy patients, 50 healthy adults, 102 healthy children, and in 64 adults and 16 children with tuberculosis: a total of 281 subjects. The responses to A and H lepromins were concordant in 96.79% of the cases. Of these, 82.91% were concordant both as to sign and as to value (1+, 2+, 3+); 13.87% were concordant only as to sign; 3.28% were not of equal sign. Lepromin A can entirely replace lepromin H. It can be used in screening Mitsuda-negative subjects in endemic areas as well as in conducting immunological and immunoprophylactic surveys, pending the production of a vaccine from laboratory cultures of *M. leprae*.—(*Adapted from* authors' summary)

Tarabini-Castellani, G., Tarabini-Castellani, G. L. and Nuti, M. II. La lepromina de armadillo (A) no induce reacciones indeseables de tipo inmunólogico en el hombre. (II. Armadillo lepromin (A) does not induce immunologically undesirable reactions in man.) Rev. Fontilles **22** (1980) 635–640. (in Spanish)

Armadillo lepromin (A) was given intradermally to 3558 persons. The test was repeated at one or two month intervals on the Mitsuda-negative subjects, i.e., on 191 subjects the second time, and on three subjects for a third time. Armadillo-derived lepromin does not appear to contain significant xenogeneic antigens based on the fact that no immunologically undesirable reactions were observed either in the first or in subsequent tests.—(*Adapted from* authors' summary)

Touw, J., Stoner, G. L. and Belehu, A. Effect of *Mycobacterium leprae* on lymphocyte proliferation: suppression of mitogen and antigen responses of human peripheral blood mononuclear cells. Clin. Exp. Immunol. **41** (1980) 397–405.

Evidence is presented that *Mycobacterium leprae* suppresses the *in vitro* proliferative response of human peripheral blood mononuclear cells (PBM) to antigen and mitogen. Lymphoproliferation induced by PPD or alloantigen stimulation was inhibited by concentrations of *M. leprae* which were not cytotoxic for lymphoblasts. In contrast, the inhibition of mitogen-stimulated PBM was seen only at higher concentrations of *M. leprae*, which proved to be cytotoxic for lymphoblasts. The inhibitory effect was found not to be dependent on a particular cell population present in leprosy patients, as PBM from normals was inhibited similarly. These findings may explain some of the immunological aberrations observed in lepromatous leprosy patients who harbor large numbers of *M. leprae* bacilli in their tissues.—Authors' Summary

Wahba, A., Cohen, H. and Sheskin, J. Neutrophil chemotactic responses in lepromatous leprosy: An *in vitro* study of 52 patients. Clin. Immunol. Immunopathol. **17** (1980) 556–561.

The chemotactic responses of neutrophils derived from 52 patients with lepromatous leprosy and 24 healthy controls

were assessed *in vitro* by a modification of the Boyden chamber method using lipopolysaccharide-activated serum as a chemotactic factor. Highly bacilliferous patients with active disease of long-standing duration had significantly reduced chemotactic responses while patients with burnt-out lepromatous leprosy as well as those with recently acquired disease showed normal chemotactic responses. Preincubation of normal human blood group O leukocytes in plasma from patients with active disease of long-standing duration markedly reduced their chemotactic responses whereas preincubation in plasma derived from patients to the other two subgroups of patients did not affect leukotaxis much. These findings suggest that the diminished chemotactic capacities among certain patients with lepromatous leprosy is secondary to the presence of certain plasma factors such as immunoglobulins or antigen-antibody complexes that may by attachment to the cell membrane block the receptors required for interaction with the chemotactic factor.—Authors' Summary

Microbiology

Chatterjee, B. R. Cultivable precursors of *Mycobacterium leprae*. Lepr. India **52** (1980) 513–526.

During attempts at test tube culture of *M. leprae* in our laboratory we have repeatedly isolated a non acid-fast, coccoid organism from lepromatous tissue and skin smears. These organisms show a tendency to generate acid-fast mycobacteria in test tube passages and in mice experimentally infected with these organisms, and a number of stable, pigmented mycobacterial cultures have been obtained from them that are being maintained in test tube media. It was previously postulated that these coccoid organisms of leprous origin were a cultivable precursor phase of the noncultivable *M. leprae* and further that *M. leprae* was a pleomorphic organism that has a cultivable non-mycobacterial phase. Further studies have been made on these precursor organisms as well as mycobacteria that either grew out of the coccoid precursors or were isolated in pure culture from lepromatous tissues and appeared to be identical. This paper deals with the biochemical and drug sensitivity patterns and infectivity in experimentally inoculated mice, of a few of these non acid-fast coccoid strains, and their mycobacterial progenies, i.e., mycobacterial converts from the coccoids, and a few mycobacterial strains isolated straight away from lepromatous nodules that showed quite identical characteristics.—Author's Summary

Dhople, A. M. and Hanks, J. H. Pedigreed stocks of *Mycobacterium lepraemurium* for cultivation and metabolic studies. Can. J. Microbiol. **26** (1980) 1247–1252.

Experience has shown that a prime requirement for investigations with *Mycobacterium lepraemurium* is pedigreed stocks of cells which provide constant baselines over a long period of time. Biochemical indicator, ATP, was employed to devise a method for preservation of metabolic pools of *M. lepraemurium* during storage. ATP assays were made by the luciferin-luciferase bioluminescent method. Several cryoprotective agents were compared at −76° and 4°C. The essential steps have been found to be: 1) for prolonged storage and constant supply of material, to freeze the intracellular bacteria within infected cells containing 28% proteins, i.e., to freeze the infected tissue; and 2) when a large number of diverse experiments are to be undertaken on a single suspension, to stabilize working stocks of refrigerated cells for 12–16 weeks by using bovine serum albumin, fraction V, and Difco yeast supplement B to compensate for the leaching of intracellular cofactors, metabolites, nucleotides, etc.—Authors' Summary

Veliath, A. J., Bedi, B. M. S. and Balasubrahmanyam, M. Macrophage culture from untreated leprosy cases. Lepr. India **52** (1980) 203–208.

Macrophage cultures from the peripheral blood were performed in 25 untreated bacteremic leprosy patients. The monocytes on conversion to macrophages in culture continued to harbor solidly stained *M. leprae* till the termination of culture. It is suggested that the majority of these bacilli are viable and capable of multiplication intracellularly in macrophages if cultures could be maintained for sufficiently long periods. It was observed that bacteremia in leprosy can be detected by the culture technique. It has been found to be more sensitive than the leukocyte adherence method.—Authors' Summary

Widebäck, K., Kronvall, G., Bjorvatn, B., Closs, O. and Harboe, M. Comparative studies of antigen 21 in *Mycobacterium* and *Nocardia* species: Possible taxonomic relationships with *Mycobacterium leprae*. Infect. Immun. **30** (1980) 413–420.

Studies of *Mycobacterium leprae*, *Mycobacterium tuberculosis*, and *Nocardia caviae* in comparison with each other and with other *Mycobacterium* and *Nocardia* species were performed on the basis of antigen 21 intramolecular heterogeneity. Three different antisera were used: rabbit anti-*Mycobacterium smegmatis* antiserum, rabbit anti-*Nocardia asteroides* antiserum, and a lepromatous serum pool. With reference to each of the three antiserum sources used, the strains were ranked in an order of relatedness or sharing of determinants. The three antisera showed distinctly different antigen 21 antibody specificities, reflecting the species origin of the immunogen. The present investigations confirmed that antigen 21 of *N. caviae* shares determinants with antigens from *Mycobacterium* strains which were not present in corresponding antigens of all other *Nocardia* strains tested. *M. tuberculosis*, as judged by antigen 21 analysis, occupies a position separate from both the slow-growing and the fast-growing mycobacterial clusters in accordance with accepted taxonomic relationships. An interesting possibility of establishing a position for *M. leprae* in relation to other mycobacterial species was apparent. The order of relatedness among the strains studied went from *M. leprae* to *M. tuberculosis* to *N. caviae* to *Mycobacterium avium* to *Mycobacterium fortuitum*, the last two being representatives of the slow-growing and fast-growing mycobacteria. It can therefore be concluded that evidence from antigen 21 analysis indicates that *M. leprae* is more closely related to *M. tuberculosis* than to the other strains investigated.—Author's Summary

Experimental Infections

Levy, L., Ng, H. and Welch, T. M. Survival of BALB/c mice after intraperitoneal infection with *Mycobacterium lepraemurium*. Isr. J. Med. Sci. **16** (1980) 780–784.

In an attempt to develop a simple, quantitative method of studying the disease that follows infection of susceptible mice with *Mycobacterium lepraemurium*, survival of BALB/c mice was measured as a function of time following i.p. inoculation with the organisms. Survival was found to be inversely related to the challenge dose of *M. lepraemurium* and unrelated to the organ-source of the organisms; survival was prolonged by treatment with isoniazid. Mice infected *M. lepraemurium* were protected against i.v. challenge with *M. marinum* administered early in the disease whereas they demonstrated enhanced susceptibility to the same challenge administered later. Conversely, prior *M. marinum* infection of mice in the hindfoot pad conferred protection against subsequent challenge with *M. lepraemurium*.—Authors' Summary

Miranda, R. O. Investigación de la resistencia del *M. leprae* utilizando el método de inoculación en la almohadilla plantar del ratón blanco. Leprología **21** (1979) 8–13. (in Spanish)

La técnica de la inoculación del *M. leprae* en la almohadilla plantar del ratón blan-

co permite básicamente: 1) Diagnóstico certero y "precoz" de la resistencia del bacilo de Hansen a las drogas utilizadas. 2) Investigación de nuevas drogas o combinaciones de las mismas con posible actividad leprostática. 3) Estudios dinámicos ya que juntamente con la inoculación en el armadillo son por el momento, los únicos medios en los cuales se puede obtener la multiplicación de los bacilos de Hansen, incluso en una cepa de ratones atímicos, es posible obtener una forma diseminada de la enfermedad, semejante a la observada en los armadillos.—(*Adapted from* the article)

Resoagli, E. H., Martinez, A. R., Resoagli, J. P., Morales, C. R., de Millian, S. G., Cao, E. A. and de Rott, M. I. O. Comunicación de un caso de micobacteriosis esplenica natural en el armadillo (*Dasypus novemcinctus*) con características histopatológicas y tintoriales similares a lepra. (A case of natural splenic mycobacteriosis in an armadillo (*Dasypus novemcinctus*) with histopathologic and tinctorial characteristics similar to leprosy.) Leprología **21** (1979) 18–25. (in Spanish)

A histopathologic study of one spleen is presented. This spleen was obtained in the necropsy of a dead armadillo. The armadillo died of undetermined causes in the experimental colony of the Facultad Ciencias Veterinarias, UNNE. The animal was captured in San Luis del Palmar Department, Province of Corrientes. Intracytoplasmic AFB were characterized by means of Ziehl-Neelsen, Fite Faraco, and King Yon. The possibility of this being a mycobacteriosis with similar characteristics to human leprosy or to other positive AFB is discussed.—Authors' Summary

Shepard, C. C., Van Landingham, R. and Walker, L. L. Searches among mycobacterial cultures for antileprosy vaccines. Infect. Immun. **29** (1980) 1034–1039.

All mycobacteria species share some antigens so there may be cultivable mycobacterial cultures that can provide protection against leprosy. Vaccine protection against *Mycobacterium leprae* infections in mice has been demonstrated for *M. leprae* itself, as living or heat-killed suspensions, and for *Mycobacterium bovis* (BCG), as living suspensions. Results are reported here with 17 other cultures. The mycobacterial suspensions were injected intradermally, and the mice were challenged in the foot pad with infectious suspensions of *M. leprae*. In two experiments, the mice were also challenged by foot pad injections of 10^7 heat-killed *M. leprae* so the foot pad enlargement could be measured. That some mycobacterial suspensions were immunogenic for some of their own antigens was suggested by reactions at the vaccine site and enlargement of the regional lymph nodes. Some mycobacterial suspensions also stimulated foot pad enlargement on challenge by homologous suspensions or by challenge with *M. leprae* suspensions. Consistent protection against infectious challenge with *M. leprae* was observed only with BCG and *M. leprae*, however.—Authors' Summary

Welch, T. M., Gelber, R. H., Murray, L. P., Ng, H., O'Neill, S. M. and Levy, L. Viability of *Mycobacterium leprae* after multiplication in mice. Infect. Immun. **30** (1980) 325–328.

To measure the rate at which *Mycobacterium leprae* are killed in the course of mouse foot pad infection after the maximum of multiplication has been achieved, *M. leprae* were harvested shortly before and at intervals after multiplication had reached the level of 10^6 organisms per foot pad, serially diluted, and inoculated into the foot pads of passage mice. Beginning one year later, foot by foot harvests of *M. leprae* were performed by passage mice, and the proportion of viable organisms in the passage inocula was calculated by means of a most probable number calculation. In addition, the proportion of solidly staining *M. leprae* was measured in the passage inocula. The proportion of viable *M. leprae* in the passage inocula was found to decrease with the time after multiplication to 10^6 organisms per foot pad of donor mice; the half time of loss of viable *M. leprae* was 25 days. The proportion of solidly staining organisms appeared to be directly related to the proportion of viable organisms, as measured by mouse passage, and inversely proportional to the time after multiplication of 10^6 organisms per foot pad.—Authors' Summary

Epidemiology and Prevention

Bhavsar, B. S. and Mehta, N. R. An epidemiological study of leprosy through school survey in Surat District (South Gujarat). Lepr. India **52** (1980) 548–556.

A school survey covering 21,412 students attending 30 primary and secondary schools in Surat city and 25 primary and secondary schools in surrounding villages was carried out. The overall prevalence rate of leprosy was 0.12%, and it was significantly higher in the rural area. The prevalence of leprosy did not show any association with the age of the students, but male preponderance was observed. The prevalence rate increased significantly with deterioration of socioeconomical conditions and home sanitary conditions. BCG vaccination seemed to protect against leprosy in the rural area. The majority of cases (92.3%) were of the non-lepromatous type. A single skin lesion was seen in 15.4% of the cases only. Nearly one-third of the total skin lesions were observed on the area of skin covered by clothes.—Authors' Summary

de Vries, R. R. P., Mehra, N. K., Vaidya, M. C., Gupte, M. D., Khan, P. M. and van Rood, J. J. HLA-linked control of susceptibility to tuberculoid leprosy and association of HLA-DR types. Tissue Antigens **16** (1980) 294–304.

In an attempt to confirm HLA-linked effect on the course of *Mycobacterium leprae* infection observed in families from Surinam (South America), we conducted a similar family study in an endemic area in India. We observed a significant ($p < 0.05$) excess of identical HLA-GLO haplotypes only from healthy parents among siblings affected with tuberculoid leprosy. Compared with healthy controls, unrelated patients with tuberculoid leprosy ($n = 15$) showed a significant heterogeneity at the HLA-DR locus ($p < 0.05$). This heterogeneity was caused by an increased frequency of HLA-DRw2 (.93 versus .53, $p < 0.05$), particularly of DRw2 homozygotes (.53 versus .11, $p < 0.005$), and a decreased frequency of HLA-DRw6 (.07 versus .58, $p < 0.005$). We observed a significant ($p = 0.03$) preferential segregation of DRw2 from DRw2 heterozygous parents not affected with tuberculoid leprosy to children with the tuberculoid type of the disease. These data confirm an HLA-linked control of susceptibility to tuberculoid leprosy only and suggest a recessive inheritance of this trait for which HLA-DRw2 appears to be a genetic marker.—Authors' Summary

Govila, A. K. and Kushwah, S. S. A study of contacts among leprosy patients. Lepr. India **52** (1980) 411–415.

The present study is a longitudinal study in which 96 families were surveyed, and 566 persons residing in leprosy patients' families were examined. Twenty new secondary cases were identified, giving rise to a gross prevalence rate of 3.45%. Males were the most affected, and the younger population was the main group of victims of the disease. Cases were present in the low socioeconomic group of the population, and the disease was mainly confined among illiterates and the low educated population. The incidence of secondary cases was highest in those residing in an extended type of family system.—Authors' Summary

Malhotra, Y. K. and Kanwar, A. J. Leprosy in Libya (Benghazi): A clinical study. J. Trop. Med. Hyg. **82** (1979) 208–210.

A clinical study of leprosy as it occurs in the Eastern part of the Libyan Arab Republic (Benghazi) is presented. Lepromatous leprosy was the commonest type (76.47%) observed. The maximum number of cases was seen in the age group of 20–49 years. An insight into the magnitude of the leprosy problem in the Libyan Arab Republic is presented.—Authors' Summary

Meesters, H. J. R. Leprosy control in The Gambia. Lepr. Rev. **51** (1980) 215–220.

The changes in the epidemiological situation of leprosy in the Republic of The Gambia are assessed from the statistics of the registered patients and through comparison of several leprosy surveys. A

marked decline in the number of registered cases (from 7000 in 1970 to 1675 in 1977) and in the estimated prevalence of leprosy (2.5% in 1947, 0.6% in 1977) is demonstrated. Several aspects of leprosy control in The Gambia are discussed. The need to continue a specialized program is stressed.—Author's Summary

Millan, J. Le dépistage de la lèpre dans un secteur de la Guadeloupe (F.W.I.). Organisation et analyse des résultats obtenus de 1973 à 1978. (Detection of leprosy in a district of Guadeloupe [F.W.I.]. Organization and evaluation [1973–1978].) Méd. Trop. **40** (1980) 161–168. (in French)

The paper presents data showing: 1) a progressive decrease of infection with a significant fall in the school age group; 2) an almost constant number of infectious patients; and 3) the growing importance of detection by private practitioners. Passive detection detects patients who, in most cases, are more seriously infected than those detected by active detection. Active detection is the only effective leprosy prophylactic method.—(*Adapted from* author's summary)

Navarrete, J. I., Lisker, R. and Pérez-Briceño, R. Serum atypical pseudocholinesterase and leprosy. Indian J. Dermatol. **18** (1979) 822–823.

The frequency of the serum atypical pseudocholinesterase variant was significantly higher ($p < 0.005$) in a group of 115 lepromatous leprosy patients than in a comparison group of 133 healthy individuals. This finding corroborates the results obtained in a group of patients from India and supports the contention that the serum atypical pseudocholinesterase is one of the possible genetic factors involved in susceptibility to leprosy.—Authors' Summary

Ramu, G., Dwivedi, M. P. and Iyer, C. G. S. A study of lepromin reaction in child contacts of leprosy patients and non-contact children in Chengalpattu District, Tamil Nadu. Lepr. India **52** (1980) 390–404.

In this study early lepromin reaction has been used to detect delayed hypersensitivity reaction to a prior infection with *M. leprae*. Recent studies indicate that a certain number of contacts who develop subclinical infection remain anergic to the lepromin test. This is indicated by the fluorescent leprosy antibody absorption (FLA-ABS) test of Abe (1979), which detects antibodies in the sera of infected individuals. Correlation of this serological test with lepromin response in contacts is in progress at the CJIL, Agra. These anergic contacts are likely to be susceptible to leprosy, a finding which would help in taking prophylactic measures.—Authors' Summary

Selvapandian, A. J., Muliyil, J., Joseph, A., Kuppusamy, P. and Martin, G. G. School-survey in a rural leprosy endemic area. Lepr. India **52** (1980) 209–216.

In the Kaniyambadi Panchayat Union area of a known leprosy endemic population, this study was undertaken. Out of 10,163 students examined, a total of 137 leprosy cases were detected—122 cases (89.1%) were of the tuberculoid type, and the remaining 15 cases (10.9%) were borderline leprosy. There were no cases of the lepromatous type, and none of them had any deformity. A total of 86.1% had a single lesion, and the rest had multiple lesions. Study of the distribution of patches over the body surface did not reveal any significant difference between covered and uncovered parts of the body.—Authors' Summary

Tello, E. E. and Nahra, M. Mal de Hansen y grupos sanguíneos en Cordoba, Argentina. Leprología **21** (1979) 38–43. (in Spanish)

Se hace una revista y comentarios de la bibliografía sobre el tema y se aporta al mismo la experiencia realizada en el Dispensario Dermatológico del Patronato del Enfermo de Lepra de la ciudad de Córdoba, Argentina.

Se estudian 129 pacientes (94 virchovianos [L], 19 tuberculoides, 10 indeterminados, y 6 dimorfos) y se comparan los resultados obtenidos con las cifras medias logradas en la población sana de la misma ciudad.

Asimismo se establecen comparaciones con los resultados de otros autores y se concluye en que existe una verdadera diferencia entre los valores alcanzados confrontando las poblaciones enfermas de raza negra y amarilla con la caucásica, pero que aunque existen algunas coincidencias aisladas se opina que—hasta el momento—no hay motivos evidentes, uniformes, y valederos para poder establecer categóricamente la relación entre grupos sanguíneos y lepra en cualquiera de sus tipos y formas.—Authors' Summary

Terencio de las Aguas, J., Bolinches Bolinches, R., Otte, A., Gil Minguillón, C., Canos Llácer, I. and Andreu Miquel, L. Estudio de la colinesterasa serica y sus variantes geneticas en los enfermos de lepra. (Study of serum cholinesterase and its genetic variants in leprosy patients.) Rev. Fontilles **22** (1980) 641–644. (in Spanish)

There are differences of opinion as to whether there exist atypical variants of cholinesterase in leprosy patients. For this reason, we compared the genetic variations in cholinesterase between healthy individuals and leprosy patients in the Fontilles sanatorium. We found a higher incidence of the heterozygous fluoruro E^uE^f among the leprosy patients. The technique of Das and Liddell was utilized, using butyrylthiocholine as substrate and automated in a bichromatic ABA-100 analyzer.—(*Adapted from* authors' summary)

Rehabilitation

Gabrielli, M., Sorrentino, M. C. and Linari, S. Desintegración del tarso en enfermos de Hansen. (Tarsal bone disintegration in Hansen's disease patients.) Leprología **21** (1979) 44–47. (in Spanish)

A patient with lepromatous Hansen's disease is presented. The patient gave a ten-year history of the disease and a history of perforating plantar ulcers on several occasions in the past. The patient presented in 1978 with gross deformity of the left foot (cuboid foot) which was not painful. X-rays showed frank destruction of the tarsus bones, a finding which is not frequent in our country. With the treatment prescribed (bed rest and plaster immobilization) the evolution of the condition has been successful as documented radiologically and by laboratory studies.—Authors' Summary

Wood, P. H. N. Appreciating the consequences of disease: the International Classification of Impairments, Disabilities and Handicaps. WHO Chronicle **34** (1980) 376–380.

It has been widely recognized that a gap in the series of existing classifications in health was the absence of one dealing with impairments, disabilities, and resulting handicaps. The International Conference for the Ninth Revision of the International Classification of Diseases (ICD), which met in Geneva in 1975, considered draft proposals for a scheme to remedy this deficiency. In May 1976, the Twenty-Ninth World Health Assembly in resolution WHA 29.35 accepted the recommendation that a classification of impairments and handicaps should be published for trial purposes as a supplement to the ICD. The *International Classification of Impairments, Disabilities, and Handicaps* (ICIDH) is now available, and its potential implications for health and social policy development could be considerable. It provides a clarification of the concepts and terminology relating to the consequences of chronic and disabling conditions and offers a medium for the better description of the different planes of experience that result from disease.—Author's Summary

Zheng, Ti-Sheng. Surgical treatment for leprotic intrinsic hand muscle paresis. 2. Surgical treatment for thumb deformity. Communications on Research of Prophylaxis and Therapeutics in Dermatology **9** (1980) 20–22. (in Chinese)

Reconstruction of thumb opposition was the chief aim of thumb deformity correction, and for this various tendon transfers were frequently used. The author presented results in 30 cases. The advantages and disadvantages of various techniques in association with the choice of motor muscles, the restoration of abduction of the index finger, and flexion deformity of the IP joint of the thumb were described. The cause of success and failure was evaluated.—Author's Summary

Other Mycobacterial Diseases and Related Entities

Bhigjee, A. I., Pillay, N. L., Omar, M. A. K., Naidoo, P. and Hariparsad, D. Serum angiotensin-converting enzyme in sarcoidosis. S. Afr. Med. J. **58** (1980) 615–616.

Serum angiotensin-converting enzyme (SACE) activity was measured in 29 patients with sarcoidosis, 51 reference subjects, seven patients with active tuberculosis, and eight patients with other lung diseases. SACE activity was increased in 93% of the patients with sarcoidosis as compared with the reference subjects. Patients with active tuberculosis and other lung diseases did not have increased SACE activity.—Authors' Summary

Calabrese, L. H., Clough, J. D., Krakauer, R. S. and Hoeltge, G. A. Plasmapheresis therapy of immunologic disease. Cleve. Clin. Q. **47** (1980) 53–72.

The term plasmapheresis (removal of plasma with or without replacement with physiologic solutions) was first used in 1914 by Abel, *et al.* in their paper "Plasma removal with return of corpuscles," which was an account of their attempt to develop an artificial kidney. Modern experience with plasmapheresis began in the early 1950s when the technique was used to remove abnormal plasma protein in a patient with multiple myeloma. In the early 1960s, the procedure was successfully employed to treat the clinical manifestations of hyperviscosity in a patient with Waldenstrom's macroglobulinemia.

In the past decade, great advances have been made in the technique of plasma exchange, and the scope of diseases treated with this method has broadened greatly. In theory, any disease in which a humoral phase is important in pathogenesis may be at least partially mitigated by removal of patients' plasma and subsequent replacement with another physiologic solution. This therapy might benefit patients with either of two types of immunologic disease: that mediated by antibody (either blocking or cytotoxic) or that mediated by circulating immune complexes (CIC) or both. We report our experience in treating nine patients with a number of different disease states all of whom had elevated CIC levels. Included are dynamic data concerning the effects of plasma exchange on levels of CIC.—Authors' Summary

Casero, R. A., Jr., Klayman, D. L., Childs, G. E., Scovill, J. P. and Desjardins, R. E. Activity of 2-acetylpyridine thiosemicarbazones against *Trypanosoma rhodesiense in vitro*. Antimicrob. Agents Chemother. **18** (1980) 317–322.

Twenty-seven 2-acetylpyridine thiosemicarbazones and analogs were tested for antitrypanosomal activity against *Trypanosoma rhodesiense* using a semiautomated *in vitro* assay system. Activity was determined by relative inhibition of uptake of two radiolabeled macromolecular precursors, [methyl-^{3}H] thymidine and L-[*U*-^{14}C] leucine, as compared to untreated controls. It was observed that the nitrogen atom of the pyridyl moiety of the 2-acetylpyridine thiosemicarbazones was essential for antitrypanosonal activity. The 2-acetylpyridine thiosemicarbazones generally inhibited the uptake of L-[*U*-^{14}C] leucine to a greater extent than they inhibited [methyl-^{3}H] thymidine uptake. Twenty-four of the 27 compounds tested exhibited activity comparable to that found for the antitrypanosomal

agent ethidium bromide.—Authors' Summary

Grange, J. M., Gibson, J., Batty, A. and Kardjito, T. The specificity of the humoral immune response to soluble mycobacterial antigens in tuberculosis. Tubercle **61** (1980) 153–156.

A high proportion of patients with tuberculosis has been shown to produce significant levels of antibodies to antigens unique to *Mycobacterium tuberculosis*, antigens restricted to the slowly growing mycobacteria, and antigens common to all species in the genus. About 20% of patients with this disease do not have significantly elevated levels of antibodies to any of these groups of antigens. Consequently, the availability of highly purified soluble antigens specific for *M. tuberculosis* would not permit more cases of tuberculosis to be diagnosed serologically.—Authors' Summary

Grange, J. M., Gibson, J., Nassau, E. and Kardjito, T. Enzyme-linked immunosorbent assay (ELISA): A study of antibodies to *Mycobacterium tuberculosis* in the IgG, IgA, and IgM classes in tuberculosis, sarcoidosis, and Crohn's disease. Tubercle **61** (1980) 145–152.

Enzyme-linked immunosorbent assay (ELISA) has been used to study the levels of antibody binding to the soluble antigens of *Mycobacterium tuberculosis* (BCG) in the IgG, IgM, and IgA classes in sera from patients with tuberculosis, sarcoidosis, and Crohn's disease. Of the patients with tuberculosis, 75% had significantly elevated levels of anti-*M. tuberculosis* antibodies in the IgG class. The levels of antibodies in the sarcoidosis and Crohn's disease had significantly elevated levels of antimycobacterial antibodies, principally in the IgM and IgA classes. These elevated levels of antibody were not related to the total levels of the immunoglobulin classes. For the purpose of serodiagnosis, an estimation of the antimycobacterial antibodies in the IgG class gives the most discriminative results.—Authors' Summary

Horio, T., Imamura, S., Danno, K. and Ofuji, S. Potassium iodide in the treatment of erythema nodosum and nodular vasculitis. Arch. Dermatol. **117** (1981) 29–31.

Twenty-one patients with erythema nodosum, nodular vasculitis, or erythema nodosum-like lesions associated with Behçet's syndrome were treated with potassium iodide. Administration of the drug for systemic effect showed a substantial effect in 11 of 15 patients with erythema nodosum, seven of ten with nodular vasculitis, and one of four with leg lesions of Behçet's syndrome. Relief of subjective symptoms, including tenderness, joint pain, and fever, occurred within 24 hr. Substantial improvement in the eruption occurred within a few days, and the lesions disappeared completely 10–14 days after therapy was initiated. The patients to whom the medication was administered shortly after the initial onset of erythema nodosum seemed to respond most satisfactorily. The effect of the drug was marked in the patients with positive C-reactive protein reactions, joint pains, and/or fever. Possible mechanisms by which potassium iodide exerts its effect are discussed.—Authors' Summary

Krakauer, R. S., Clough, J. D. and Ilfeld, D. Recent advances in immunology. Cleve. Clin. Q. **47** (1980) 73–77.

Of the three theoretical mechanisms by which autoantibody production can arise (intrinsic B-cell defect, helper T-cell excess, and suppressor T-cell defect) we have evidence suggesting that a helper T-cell excess is involved in scleroderma and a suppressor T-cell defect in SLE. These may represent two ends of defects in the immunoregulatory spectrum that may result in autoimmunity. Further understanding of abnormal immunoregulation that may occur in or be responsible for autoimmunity will hopefully result in new and better therapeutic approaches to these diseases. Other situations in which defective immunoregulation has been implicated recently include sarcoidosis, juvenile rheumatoid arthritis, chronic active hepatitis, inflammatory bowel disease, psoriasis, and thyroiditis. The list of diseases of presumed autoimmune etiology in which no evidence for specific immunoregulatory defects is present is still increasing, and this may indeed prove to be

a sizable area of medical science.—Authors' Summary

ten Dam, H. G. and Hitze, K. L. Determining the prevalence of tuberculosis infection in populations with non-specific tuberculin sensitivity. Bull. WHO **58** (1980) 475–483.

In tropical countries, where there is generally a high prevalence of non-specific sensitivity, the tuberculin test is inadequate for detecting tuberculosis infection. A method is proposed by which the prevalence of infection in the population can be determined under such circumstances, thus making possible meaningful epidemiological surveillance of the disease. This method compares levels of tuberculin sensitivity in individuals before and after BCG vaccination. If BCG vaccination fails to produce an increase in tuberculin sensitivity, the individual must have been infected with human or bovine tubercle bacilli.—Authors' Summary

Trial of BCG vaccines in South India for tuberculosis prevention. Tuberculosis Prevention Trial, Madras. Indian J. Med. Res. **72** (Suppl.) (1980) 1–74.*

The protective effect of BCG vaccination in man has been evaluated in a number of controlled trials. In these trials, the protection observed varied from none to 80%. In view of these conflicting results, a large scale BCG trial was planned in India and the protective effect of BCG vaccination evaluated in a controlled, double-blind, community trial near Madras in South India in a population of about 360,000 persons. In this trial, all individuals aged 1 year and above were tested with 3 IU of PPD-S and 10 units of PPD-B, and simultaneously BCG vaccines and placebo were allocated randomly to all those aged 1 month and above. All individuals aged 10 years and above were X-rayed, and from such persons whose photofluorograms were interpreted as abnormal, two specimens of sputum were collected and bacteriologically examined. Intensive efforts were made, by means of regular follow-up surveys every 2½ years and more frequently, by selective case-finding among suspects and further by maintaining permanent diagnostic services for symptomatics, to identify all new cases of tuberculosis occurring in the community. Mutually exclusive random samples of the population were retested with tuberculin at 2½ months, 2½ and 4 years after intake in order to evaluate the tuberculin sensitivity over time in the study population. The study population was characterized by a high prevalence of tuberculous infection and disease as also by a very high prevalence of nonspecific sensitivity. This report presents findings of the first 7½ years of follow-up. The tuberculin sensitivity induced by BCG vaccination was highly satisfactory at 2½ months but waned considerably between 2½ months and 2½ years with no further waning in sensitivity thereafter. Incidence of infection was high in the study population. However, incidence of bacillary disease was more frequent among initial tuberculin reactors, especially among the older persons than among nonreactors of whom the majority were in the younger age groups. The distribution of new cases of pulmonary tuberculosis among those not infected at intake did not show any evidence of a protective effect of BCG. Certain hypotheses that may explain the findings have been discussed.—Authors' Summary

* Editor's Note: The following editor's note appears as an erratum accompanying this supplement: "An abridged report of the trial of BCG vaccines in South India was published in Indian J. Med. Res. **70** (1979) 347–363, along with an editorial contributed by an ICMR Expert Group. As indicated in the editorial, the comprehensive report of the same trial has been brought out now as a special supplement of the journal."—G. V. Satyavati, Editor, Indian J. Med. Res.