

CURRENT LITERATURE

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Clinical Sciences

✓ **Jennings, W. H., Joshi, P. V., Pandey, S. D., Mehta, J. M. and Antia, N. H.** Long-term follow-up of surgery for leprosy. *Lepr. India* 47 (1975) 176-185.

In the follow-up of 180 hand operations (108 lumbrical replacements and 72 opponens replacements) over a period of about 16 years, 55 showed deterioration (36 lumbrical replacement and 19 opponens replacement) while 8 showed improvement (5 lumbrical replacement and 3 opponens replacement). The deterioration of results in most cases was due to iatrogenic deformities, especially "swan neck" deformity after sublimis transfer operation.

It is doubtful that post-operative occupation has any influence on the long-term results of the hands and feet.

Nearly 7% of temporalis sling cases showed iatrogenic deformity. Some results of this operation also showed improvement (4 out of 45). Iatrogenic deformity was the only cause for deterioration of results in this operation. The rate of deterioration of results in the face lift operation cases was slightly above 14%. No cause could be found for deterioration of the face lift operation results. All the "poor" results of the post-nasal inlay cases were due to avoidable causes. The rate of deterioration of eyebrow grafts was very high (76 out of 111). The balding and shrinkage of grafts was the chief cause for deterioration of results in this operation. This operation showed varying results in the same patient as "good" or "fair" on one side and "poor" on the other side.—(Adapted from authors' conclusion)

✓ **Kalthoff, P. G.** Die Lähmung der Handbinnenmuskeln bei Leprakranken und ihre operative Behandlung. [Paralysis of the intrinsic muscles of the hand in leprosy patients and its surgical treatment.] *Handchirurgie* 3 (1971) 8-14. (In German)

The results of 68 tenolyses in the hands of 32 patients are presented: 61 in flexor tendons and 7 in extensor tendons. The tenolysis is described as a difficult but useful operation, of which the indications, method and postoperative care are of great importance for good results.—Author's English Summary

✓ **Sheskin, J., Hermel, J. and Even-Tov, Y.** El sentido del gusto en el mal de Hansen. [Taste sensation in leprosy.] *Leprolgia* 19 (1974) 3-6. (In Spanish)

Taste sensation was examined in 59 patients presenting all forms of leprosy, and in a control group of 57 subjects.

The test used was the Greco-Latin square design drop test and the main results are summarized as follows: 1) Leprous patients showed significantly less sensitivity to sweet, salty and bitter tastes, as compared to controls; no significant difference was found in sensitivity to sour taste. 2) There was no significant difference in taste sensitivity between the following three groups: a) patients exhibiting lepromatous leprosy and patients exhibiting other forms of the disease; b) between smokers and nonsmokers; and c) between adults of various age groups.—(Adapted from English summary)

Chemotherapy

✓ **Aschhoff, M.** Treatment of leprosy with rifampicin and Isoprodian in 38 patients at St. Thomas Hospital, Chetput, South India. *Lepr. Rev.* **46** Suppl. (1975) 173-178.

A clinical and bacteriologic study is described of rifampicin at a dose of 300-600 mg daily combined with Isoprodian, two to three tablets daily in 38 patients, 30 of them lepromatous, and continued for periods up to 16 months. Clinical and neurologic improvement was general, in some cases outstanding. Bacteriologic improvement was inconstant. A rapid decline in Morphological Index to 1% or less was usual within six months. In some cases the decline in Bacteriological Index was outstanding, superior to that experienced in patients receiving clofazimine or high dosages of dapsone, but in other cases this was not so.

Side-effects included mild hepatitis with jaundice in the first few weeks of treatment, which did not demand withdrawal from the trial. There was one case of exfoliative dermatitis, and three patients were withdrawn from the trial because of severe reactions resulting in paralysis.—Author's Abstract

✓ **Azulay, R. D., Silva, N. C. da, Zeo, A., Jesus, M. de and Franca, C. B.** Personal experience with clofazimine in the treatment of leprosy. *Lepr. Rev.* **46** Suppl. (1975) 99-103.

The authors present the results obtained with 20 patients in an advanced stage of long-standing lepromatous leprosy, 15 of whom had sulfone-resistant bacilli.

1. Clofazimine has definite activity in leprosy and in patients with sulfone-resistant bacilli.

2. Activity is shown by resolution of the lesions and disappearance of bacilli.

3. Clofazimine does not precipitate leprosy reaction as is seen in patients taking dapsone.

4. Side-effects are negligible and do not interfere with treatment.—Authors' Abstract

✓ **Bragina, V. S., Sluvko, Z. A., Strutchkova, V. N. and Diomina, L. M.** Treatment of leprosy with Acediasulfone. *Scientific Works Lepr. Res. Inst.* **8/13** (1974) 427-

430. (In Russian)

The authors found that by using Acediasulfone (Sulfone-Cilag) in treating leprosy the lepromatous eruptions on the skin regressed more during the first six to ten months of treatment. At the same time the amount of mycobacteria in the skin decreased. No toxic influence of the drug occurred on the blood forming system and peripheral nerves; there was some toxic effect on liver function, and a slight increase in toxic effect on kidney function. The drug seldom caused exacerbations. The effect of treatment with Acediasulfone is weaker than that of Solusulfone, and that is why Solusulfone has no advantage over the main drugs of the sulfone group.—(Adapted from N. Torsuev's summary)

✓ **Depasquale, G.** Rifampicin and Isoprodian in combination in the treatment of leprosy. *Lepr. Rev.* **46** Suppl. (1975) 179-180.

Reviewing the progress over a two year period of 192 Maltese patients treated with rifampicin combined with Isoprodian, a much quicker response to therapy was observed than with any other type of therapy used earlier. The combination was effective even in cases previously treated for a number of years, though early cases seem to show the speediest response to treatment. The combination of drugs was well tolerated, and reactions could be controlled with the use of thalidomide without interruption of therapy. The therapy was most acceptable to patients.—Author's Abstract

✓ **Ellard, G. A.** Pharmacological aspects of the chemotherapy of leprosy. *Lepr. Rev.* **46** Suppl. (1975) 41-51.

Pharmacologic and bacteriologic aspects of the treatment of lepromatous leprosy with dapsone, rifampicin, clofazimine, acedapsone, long-acting sulfonamides, thiacetazone, thiambutosine and other diphenylthioureas are considered, and the problem of preventing lepromatous patients ultimately relapsing with drug-resistant strains of *Mycobacterium leprae* is discussed.—Author's Abstract

✓ **Evstratova, V. A., Lestchenko, A. I., Tschernisheva, L. I. et al.** Lamprene in the combined treatment of lepromatous leprosy. Scientific Works Lepr. Res. Inst. **8/13** (1974) 431-435. (In Russian)

As a result of the clinical study of Lamprene in combination with sulfones it was found that Lamprene is an effective drug for treatment of leprosy patients when their resistance to sulfones rises. Lamprene causes the regression of clinical and histologic changes, and is most effective when used in combination with other drugs in treating relapses of the disease as it causes depression of lepromatous reactions.—(Adapted from N. Torsuev's summary)

✓ **Gatti, Juan C.** Combined therapy in leprosy. Lepr. Rev. **46** Suppl. (1975) 155-160.

We are submitting here our trials with combined therapy in leprosy. The following combinations of drugs were used.

a) Dapsone 25 mg daily plus rifampicin 300 mg daily in 43 outpatients, of whom 32 had lepromatous leprosy;

b) Dapsone 50 mg or 100 mg daily plus rifampicin 300 mg daily in 70 inpatients with lepromatous leprosy in the Sanatorio Colonia Baldomero Sommer;

c) Dapsone 25 mg daily plus clofazimine 200 mg weekly in 38 outpatients with lepromatous leprosy;

d) In addition, comment is made on four patients with lepromatous leprosy in whom the addition of dapsone to clofazimine resulted in an improvement in bacteriologic status.

We believe that combined therapy is useful because it not only produces clinical and bacteriologic improvement in patients with lepromatous leprosy, but also induces fewer and less severe reactional episodes. Furthermore, it has a lower tendency to favor the development of resistance.—Author's Abstract

✓ **Hamzah, M. and Kosasih, A.** Preliminary experience with rifampicin and Isoprodian (L73A)—combination in lepromatous leprosy. Lepr. Rev. **46** Suppl. (1975) 181-187.

Nineteen male patients suffering from lepromatous leprosy are being treated with rifampicin and Isoprodian. So far, eight patients have completed six months of follow-up, five patients have received treatment for

less than six months, and another six patients have just started treatment.

Out of 13 patients under treatment, 10 patients so far have become bacteriologically negative, accompanied by clinical improvement, especially in the macular, nodular and diffuse types of infiltration; whereas miliary and lenticular types of infiltration improved slightly. Side-effects were mild, except in one patient who dropped out because of severe vomiting.

Laboratory examinations showed no significant changes in the blood picture and the initial high value of ESR gradually decreased.—Authors' Abstract

✓ **Hogerzeil, L. M. and Prabhudas, N.** The effect of long-term steroid therapy on patients treated with clofazimine (Lamprene). Lepr. Rev. **46** Suppl. (1975) 111-115.

A study was undertaken in 18 leprosy patients and 31 controls to find out if Lamprene can prevent a flare-up of the infection with *M. leprae* during long-term steroid therapy. All patients were either BL or LL; some were given daily Lamprene 100 mg and prednisone 10 mg because of persistent reactions, others twice weekly on Lamprene 100 mg and daily prednisone 10 mg for the same reason. The duration of treatment varied from 6 to 23 months. The control patients were given Lamprene only, either daily 100 mg or twice weekly 100 mg. Their reactions were less severe and therefore they did not require prednisone. It was found that in both groups (Lamprene plus prednisone and Lamprene only) there was a satisfactory reduction of the MI (Morphologic Index) to zero or less than 1%. But as regards the BI (Bacteriologic Index) the patients on Lamprene plus prednisone did clearly better than the patients on Lamprene only. It thus appears that long-term steroid therapy has no adverse effect on the BI and MI of lepromatous patients, provided that they are treated with Lamprene at the same time.—Authors' Abstract

✓ **Hogerzeil, L. M. and Rees, R. J. W.** The effect of a single dose of rifampicin on the infectivity of the nasal discharge in leprosy (preliminary communication). Lepr. Rev. **46** Suppl. (1975) 147.

This study was undertaken in London

(Rees) and Dichpalli, India (Hogerzeil). Twenty-four hour nose blows before and after a single dose of rifampicin, 30 mg per kg body weight, were sent on ice from Dichpalli to London for inoculation into mouse foot pads. The final results from mice are not yet available, but total counts and morphology of *M. leprae* from the nasal discharges before and after rifampicin suggest that within four days of a single dose of rifampicin the infectivity of patients was considerably reduced.—Authors' Abstract

✓ **Innami, S., Leguizamon, O. R. and Alvarenga, A. E.** Clinical and bacteriologic effects of rifampicin in combination with L73A in leprosy: observation for six months. *Lepr. Rev.* **46** Suppl. (1975) 169-172.

Therapeutic effects of rifampicin in combination with L73A were observed both clinically and bacteriologically in 30 patients with lepromatous leprosy for six months.

It was evident that the fall of BI was gradual and the decrease of MI was rapid in practically all cases. One of the most favorable signs of clinical improvement was the flattening and absorption of nodules and other raised skin lesions in a short time. ENL was observed in about 33%, mild dizziness was seen frequently as a side-effect.—Authors' Abstract

✓ **Ivanova, N. N.** The content of 5-oxyindolyacetic acid in the urine of patients with leprosy. *Vestn. Dermatol. Venerol.* **4** (1975) 70-72. (In Russian)

The content of 5-oxyindolyacetic acid (5-OIAA) was determined by the method of Underfriend *et al.* (1955), in the daily urine of ten apparently normal subjects (controls) and in 106 patients with leprosy (50 with lepromatous, 36 with undifferentiated, 17 with tuberculoid and 3 with dimorphous marginal). The results of the study showed an increase in 5-OIAA excretion in the urine of patients with lepromatous leprosy; as the disease regressed it became normal gradually. In the regressive stage of undifferentiated leprosy the content of 5-OIAA was increased in approximately 25% of the patients. In the regressive stage of leprosy of tuberculoid type the content of 5-OIAA in the urine was normal or slightly decreased.—Author's English Summary

✓ **Karat, A. B. A.** Long-term follow-up of clofazimine (Lamprene) in the management of reactive phases of leprosy. *Lepr. Rev.* **46** Suppl. (1975) 105-109.

Observations in 120 leprosy patients with reaction treated with Lamprene for periods ranging from three months to five years are presented. Lamprene was found to be an effective therapy for ENL, acute neuritis, eye complications associated with reaction, epistaxis, hemoptysis and nasal discharge due to leprosy rhinitis. No adverse effects were noticed in three women who were on continuous treatment with Lamprene immediately prior to their becoming pregnant, throughout pregnancy and puerperium. Except for hyperpigmentation of the child, no other deleterious effect on the fetus was noted. Two patients developed "granulomatous enteritis" while on Lamprene. Bacterial clearance as judged by fall in the BI was comparable to that seen in patients on dapsone 100 mg daily.

After six months of continuous treatment, no recurrence of ENL was seen in any of the patients. There was significant improvement in motor and sensory functions in patients with acute neuritis in all types of leprosy.—Author's Abstract

✓ **Karat, A. B. A.** Low dose dapsone therapy in lepromatous leprosy. *Lepr. Rev.* **46** Suppl. (1975) 89-92.

Under the conditions of this study, dapsone in doses of 5 mg and 10 mg daily when administered to patients with lepromatous leprosy is an ineffective therapy in terms of the killing and elimination of *M. leprae* from human skin and bone marrow. A real danger of facilitating the emergence of resistant bacilli exists. Therefore, until there is more evidence from long-term therapeutic trials of low dose dapsone in bacillated types of leprosy, conventional dosage of dapsone is recommended.—Author's Abstract

✓ **Karat, A. B. A.** Viability of *M. leprae* in the skin and bone marrow of patients with lepromatous leprosy while on dapsone or Lamprene. *Lepr. Rev.* **46** Suppl. (1975) 69-72.

The pattern of killing of *M. leprae* in the skin and bone marrow of untreated lepromatous leprosy patients was studied after

initiation of specific treatment with dapsone 100 mg daily (five patients) as compared with clofazimine 100 mg daily (five patients). It was found that while both clofazimine and dapsone appear to be equally effective in killing *M. leprae* in the skin, bacilli remained viable in the bone marrow long after they ceased to be viable in the skin, in four patients (two on dapsone and two on clofazimine) after 720 days. The implications of this in relation to relapse/recrudescence are discussed, and the usefulness of the mouse model in providing information of value to the clinician is emphasized.—Author's Abstract

✓ **Krenzien, H. N.** Preliminary experience with rifampicin and Isoprodian in combination in leprosy treatment. *Lepr. Rev.* **46** Suppl. (1975) 189-198.

Sixty-seven patients with lepromatous leprosy were given combined treatment with rifampicin and Isoprodian at Balaka Leprosy Hospital in Malawi, and experiences during the first 15 months are described. Drug administration was given orally according to body weight. Several criteria of control were applied. In addition to routine skin smears, serial biopsies were taken simultaneously, homogenized, the bacilli counted and the bacillary load of the skin calculated per mg of tissue. Clinical improvement from moderate to dramatic occurred in all patients in a matter of months. The fall of the BI was on the average one unit on Ridley's scale, the homogenate counts indicate a bacilli reduction of more than 90% after one year of treatment. A comparison of the simultaneously taken skin smears and biopsy counts was undertaken. The frequency of reactional states under combined therapy and the relationship to secondary parasitic infectious diseases are described. Side-effects were mostly transitory, in five cases the combination tablet Isoprodian was discontinued. Some patients showed slightly elevated liver enzymes. However, more biochemical investigation is needed with regard to liver and kidney function under this therapy.—Author's Abstract

✓ **Languillon, J.** Treatment of leprosy with clofazimine, rifampicin and Bayrena. *Lepr. Rev.* **46** Suppl. (1975) 81-84.

In Africa, 8% of leprosy patients have the

lepromatous form and 85% have the tuberculoid form of the disease. Treating these patients with dapsone requires several years to produce good results. Treatment with ace-dapsone is still in the experimental stage, and rifampicin is too expensive. There are two drugs remaining; clofazimine, which is the treatment of choice for those with lepromatous leprosy, and sulphanilamides (sulfamethoxypyrimidine) for treatment of the tuberculoid form of leprosy and for acute inflammation of the peripheral nerves.—Author's Abstract

✓ **Leiker, D. L.** Effect of mono treatment and combined morphology of *M. leprae* in the skin. *Lepr. Rev.* **46** Suppl. (1975) 73-79.

A study is made of the effect of clofazimine, rifampicin, a combination of rifampicin with isoniazid and sulfamethoxy-pyrazinamide, and a combination of rifampicin with tri-methoprim-sulfonamide and prothionamide, on the morphology of *M. leprae* in foamy cells, in arrectores pilorum muscles, in blood vessel walls, and in nerves in the skin of patients with lepromatous leprosy. The method of assessment was by blind examination of serial biopsies, taken each time from the same lesion.

At the onset of the trial the percentage of granular bacilli was, on the average, 14.3% lower in blood vessel walls, 8.3% lower in arrector pilorum muscle, and 8.1% lower in nerves, than it was in foamy cell infiltrates. Occasionally higher percentages of granular bacilli were found in muscle or nerve, and this was related to previous treatment.

After one to three months of treatment with all drug regimens, the percentages of granular bacilli increased markedly, not only in the foamy cell infiltrates, but also proportionally in smooth muscle and nerve. After one to two years of treatment in most patients all or nearly all bacilli had become granular with no significant differences between the percentages in foamy cell infiltrates, smooth muscle and nerve.

The effect of clofazimine was slower than that of the other drug regimens.

No significant difference was found between the group of patients treated with rifampicin and those treated with a combination of rifampicin with other drugs. The finding of 99% granular bacilli in several patients treated for one to two years indi-

cates that none of the drug regimens had produced complete clearance of viable bacilli. Even if only 1% of the nongranular bacilli is viable, in a lepromatous patient with a load of bacilli of 10^{10} , a granularity index of 99% means that 10^6 viable bacilli are still present.

The method used is not regarded as sufficiently sensitive for excluding the possibility that even in patients with counts of 100% granular bacilli complete clearance of viable bacilli has been achieved. The rapid and good response of bacilli in muscle and nerve in the skin to all drug regimens suggests that these sites are not the only or the most important sites of therapy-resistant bacilli. Other sites, e.g., large peripheral nerves, bone marrow and internal organs should be investigated. One patient treated with the combination supposed to have the highest bacteriocidal activity (rifampicin-eusaprimethionamide), absconded after four months of treatment and relapsed after a period of two years without treatment, indicating that not all viable bacilli were eliminated. In this patient in a biopsy of an old lesion large numbers of bacilli were present, but all bacilli were granular, whereas in the new relapse lesions a high percentage of nongranular bacilli was found. This suggests that the relapse was not due to survival of bacilli in old skin lesions, but to therapy-resistant bacilli at other sites.—Author's Abstract

- ✓ **Nebout, Max.** Résultats d'un essai contrôlé de l'extrait titré de *Centella asiatica* (ETCA) dans une population lépreuse présentant des maux perforants plantaires. [Results of a controlled trial of an extract of *Centella asiatica* (ETCA) in leprosy patients with perforating plantar ulcers.] Bull. Soc. Pathol. Exot. 67 (1974) 471-478. (In French)

The author studied 90 leprosy patients with plantar ulcers in Cameroun. These patients were divided at random into three equal groups: 1) ETCA by intramuscular (IM) injection and semi-weekly applications of an ointment containing ETCA to the ulcer, 2) placebo by IM injection and ETCA in ointment semi-weekly to the ulcer, and 3) routine cleansing and bandaging (controls). The study was done double-blind. The patients were treated for two months and the

therapeutic effectiveness assessed by ulcer size. Highly significant differences were observed between both therapeutic groups and the controls, but there was no difference between the two therapeutic groups. The drug was well tolerated. [Note: *Centella asiatica* belongs to the Umbelliferae (or Carrot) family and is widely distributed in warm climates. The author apparently used a preparation isolated in Madagascar. The portion of the plant used to prepare the extract is not identified but other sources indicate that the leaves are used medicinally in the Orient.]—W. M. Meyers

- ✓ **Opromolla, D. V. A. and Tonello, C. J. S.** Antibiotics in leprosy, with special reference to rifampicin. Lepr. Rev. 46 Suppl. (1975) 141-145.

The authors record the results obtained with various antibiotics, in particular the rifamycins, in the treatment of leprosy.

Improvement was most obvious and rapid in those patients whose disease was getting worse, and in whom bacterioscopy showed morphologically typical, solid and long bacilli.

They analyze the results obtained with rifampicin in daily doses of 600 mg to 900 mg observed for varying lengths of time. They conclude that rifampicin should not be used alone. In cases resistant to other drugs, former treatment should be maintained in conjunction with the antibiotic until the reactivation is controlled. In patients who have had no previous treatment the antibiotic could be given in addition to sulfones, but not for longer than 120 days.—Authors' Abstract

- ✓ **Pattyn, S. R., Rollier, M. T., Rollier, R., Saerens, E. J. and Dockx, P.** A controlled clinical trial of continuous and intermittent rifampicin therapy during an initial three month period in lepromatous leprosy: final analysis. Lepr. Rev. 46 Suppl. (1975) 129-139.

A controlled clinical trial was organized as a three month introductory treatment of lepromatous leprosy, comparing the following treatment regimens administered in the hospital: dapsone 100 mg daily, rifampicin 450 mg daily, rifampicin 900 mg once a week, and clofazimine 300 mg once a week. Thereafter the patients were discharged and

treated with standard dapsone 100 mg in routine self-administration. Clinical, biologic and microbiologic assessments were performed at the beginning and after 1, 2, 3, 6, 9 months of treatment. BI and MI were determined on a blind basis. One hundred and twenty-nine patients were admitted to the trial, 93 remaining for final analysis. Results show that from a microbiologic standpoint the two rifampicin groups behaved similarly, their MI reaching minimum levels within one month, as compared with three to six months in the case of the dapsone and clofazimine treated groups, the clofazimine group being the slowest. Clinical improvement was somewhat more rapid in the RMP groups, especially the cicatrization of soft palate ulcerations and in the daily rifampicin group the regression of peripheral anesthesia. There was somewhat more ENL, although not statistically significant, after rifampicin weekly. There were no other complications associated with any of the treatment schedules. The results show that intermittent, once weekly rifampicin treatment is as efficient as daily therapy, and that the period of treatment may even be shortened to two months, thus reducing further the total amount of drug administered. Clofazimine 300 mg once a week induces too slow an improvement, although it could be useful as an addition for combined introductory intermittent therapy.

Nasal smears may be as sensitive indicators of the bacteriologic evolution under drug treatment as are skin biopsies.—Authors' Abstract

✓ **Pearson, John M. H.** Chemotherapeutic trials in patients with nonlepromatous leprosy. *Lepr. Rev.* **46** Suppl. (1975) 63-65.

The only way to determine whether a leprosy patient is cured is to discontinue anti-leprosy treatment and continue follow-up to see if his disease recurs. Trials of this type are required in nonlepromatous leprosy: their aim should be to determine, in different types of leprosy, the minimum period of treatment required to give an acceptable relapse rate. Such trials may also serve to identify promising new drugs or drug combinations for the treatment of lepromatous leprosy, for a regime which shortens the time required to cure lepromatous leprosy may be expected to reduce the relapse rate in nonlepromatous cases.—Author's Abstract

[In the chemotherapy of infectious disease two major factors are concerned: the effectiveness of the chemotherapeutic agent and the action of the host's tissue defense mechanisms, especially so when the chemotherapeutic agent is not bactericidal when used in the host [*IJL* **39** (1971) 890-891]. Since in lepromatous leprosy the host defenses are strikingly deficient as compared to those of tuberculoid and dimorphous leprosy it is difficult to see how studies of reduced relapse rate in the latter two categories can be interpreted with any confidence as being of much guidance with respect to lepromatous leprosy.—Editor]

✓ **Pearson, J. M. H., Rees, R. J. W. and Walters, M. F. R.** Sulfone resistance in leprosy. A review of one hundred proven clinical cases. *Lancet* **2** (1975) 69-72.

An account is given of the first 100 consecutive proven cases of sulfone resistance in leprosy, detected in Malaysia between 1963 and 1974. Proof of resistance was clinical in 80 patients and was obtained by drug-sensitivity testing in mice in 96 patients; 76 cases were proved both clinically and experimentally, and there was no discrepancy between the two methods. Sulfone resistance was confined to patients with lepromatous type leprosy, i.e., patients with a large bacterial population. Clinical evidence of relapse due to drug resistance appeared 5 to 24 years after the start of sulfone treatment. Low dosage favored the appearance of resistance; therefore regular treatment of lepromatous leprosy with dapsone in full dosage is recommended. The attainment of "skin smears negative for leprosy bacilli" is no test of cure of lepromatous leprosy.—Authors' Summary

✓ **Poloz, T. P.** Metacyl in combined drug treatment of leprosy. *Scientific Works Lepr. Res. Inst.* **8/13** (1974) 436-440. (In Russian)

Some articles on the use of pyrimidine derivatives in the treatment of different diseases have appeared recently in the USSR. These derivatives have a stimulating effect on albumin metabolism, phagocytic activity of leucocytes, production of antibodies, and absorbing activity of the reticuloendothelial system. They also increase resistance of the liver cells against poisons, strengthen the

action of many drugs and weaken their toxicity. The author treated 61 lepromatous patients with Metacyl. The drug was administered by mouth three to four times a day in the amount of 0.5 gm for one month, and then treatment was stopped for an interval of two to four weeks. Such courses were repeated during the whole period of treatment. Drug tolerance was good. The best therapeutic effects were had by patients who were not previously on drug treatment before they began their combined treatment with Metacyl and antileprosy drugs.—(*Adapted from N. Torsuev's summary*)

✓ **Ramanujam, K., Iyer, C. G. S. and Ramu, G.** A preliminary report on a therapeutic trial with acedapsone in lepromatous leprosy. *Lepr. Rev.* **46** Suppl. (1975) 85-87.

Fifty cases of lepromatous leprosy were included in a double-blind trial to assess the therapeutic values of DADDs in lepromatous leprosy using DDS as the control drug. During the period of 19 months the study has been in progress, 28 cases were lost to the study owing to patients going away on voluntary discharge, etc. In the 22 cases who continued to participate in the study over a period of 15-19 months, the findings indicate that the drug is effective and well tolerated.—Authors' Abstract

✓ **Ramanujam, K., Iyer, C. G. S. and Ramu, G.** A report on a controlled clinical trial with conventional and one third conventional dose of dapsone administered orally once a week in lepromatous patients. *Lepr. Rev.* **46** Suppl. (1975) 93-97.

Therapeutic investigation with dapsone administered orally in the conventional (10 mg/kg of body weight/week—Group A), and one third of the conventional dose (3.33 mg/kg of body weight/week—Group B), as a single dose once a week to lepromatous cases, using double-blind procedures over a period of 130 to 265 weeks was concluded in September 1973. The findings of the study showed: (1) DDS administered as a single dose once a week was therapeutically effective. (2) One third the conventional dose was as effective (perhaps better) as the conventional dose. (3) Lepra reaction occurred in both groups but tended to be more severe in Group A. (4) Insomnia was a frequent and

sometimes disturbing side-effect in this regimen of therapy.—Authors' Abstract

✓ **Ramanujam, K., Iyer, C. G. S. and Ramu, G.** Open trial with clofazimine in the management of recurrent lepra reaction and of sulfone sensitive cases: a preliminary report. *Lepr. Rev.* **46** Suppl. (1975) 117-120.

An open trial to assess the value of clofazimine in the management of cases of lepromatous leprosy with recurrent lepra reaction and those who are sulfone sensitive was commenced in February 1973. Thalidomide was used as the drug in the control subjects. Up to the end of August 1974, 61 cases had been admitted into the study. In the majority of instances the drug has been found to be effective. In three instances clofazimine failed to confer beneficial effects. Six cases in whom the maintenance dose of the drug was stopped after 52 weeks of continued control of the reactive state, have not revealed any recurrence of reaction.—Authors' Abstract

✓ **Rees, R. J. W.** Chemotherapeutic trials and their assessments. *Lepr. Rev.* **46** Suppl. (1975) 17-24

The well-established methods for the conduct and assessment of chemotherapeutic trials in leprosy have more recently been enhanced by the inclusion of the mouse foot pad infection. Examples are provided of the use of this infection as a more sensitive method for the assessment of new drugs, their speed of action and the detection of persister viable organisms and the emergence of drug-resistant bacilli. The importance of these results in relation to the value of short-term trials in the initial assessment of a new antileprosy drug and the necessity of very-long-term trials in the final assessment of a new drug or new drug regimen in the treatment of lepromatous leprosy are discussed.—Author's Abstract

✓ **Rees, R. J. W.** Rifampicin: the investigation of a bactericidal antileprosy drug. *Lepr. Rev.* **46** Suppl. (1975) 121-124.

The purpose of this paper is first to present briefly some general conclusions that have emerged from our experience in the use of rifampicin mainly in the Leprosy Research Unit, National Leprosy Control Cen-

ter, Sungei Buloh, Malaysia, and more recently in the Medical Research Council Leprosy Research Project, Addis Ababa, Ethiopia; and secondly, to report in more detail on some of the special studies from which this experience has been derived.—Author's Abstract

✓ **Ridley, Dennis S.** Problems in the design of medium and long-term therapeutic trials. *Lepr. Rev.* **46** Suppl. (1975) 59-61.

The killing of *Mycobacterium leprae* in vivo and its subsequent lysis are separate functions, both of which are governed by immunity. The first is also effectively achieved by chemotherapy, but it has not been shown that any of the known drugs have any effect on lysis. Any such effect is greatly outweighed by that of immunity even in lepromatous patients.

Medium and long-term drug trials in leprosy should be concerned with the general progress of the patient and the detection of relapse. It is doubtful whether there are any drugs that warrant the type of trial which is based on an assessment of bacterial lysis. Such trials are complex, time consuming and the resources available are limited. If there is any regimen that justifies such a trial present opportunities should not be wasted. In such trials the initial MI need not be a limiting factor.—Author's Abstract

✓ **Rohde, R.** Report of combined therapy in leprosy with rifampicin and Isoprodian conducted at the Bisidimo-Center, Ethiopia. *Lepr. Rev.* **46** Suppl. (1975) 199-205.

On the basis of experimental results by the Borstel Research Institute, 62 patients (BL and LL cases) from the Bisidimo-Center, Ethiopia, received a combination of rifampicin and Isoprodian for a definite length of time under control and clinical conditions. In the same way 18 patients under dapsone monotherapy could be observed.

During treatment good improvement could be seen under both medications, however, the improvement was better under the combined therapy. Side-effects were exceptional; reactions occurred in both groups.

After therapy had to be discontinued, regular controls of the patients were arranged. In the dapsone group a deterioration was soon found, and treatment had to be continued. After combined therapy, however,

the trend of improvement continued, the clinical and bacteriologic improvement has shown to be progressive; up to now (in many cases more than two years after treatment was stopped) no persistent signs of relapse could be found. The patients will continue under further observation.—Author's Abstract

✓ **Saerens, E. J.** The use of rifampicin in the treatment of leprosy. *Lepr. Rev.* **46** Suppl. (1975) 125-128.

Rifampicin is the most active drug in the experimental mouse foot pad infection with *M. leprae* and in the treatment of human lepromatous leprosy as judged by the rapid decline in the Morphologic Index.

Its definite place in the overall treatment of human leprosy needs, however, to be further ascertained through controlled clinical trials exploring different therapeutics, also intermittent and therefore less expensive regimens associated with careful patient monitoring for side-effects.—Author's Abstract

✓ **Saul, Amado.** Thalidomide dependence and thalidomide resistance. *Leprolgia* **19** (1974) 260-264.

Reported herein are the results of thalidomide treatment of 100 patients with leprosy reaction from the Centro Dermatologico Pascua, Mexico. The patients were divided into two groups: those who have had to continue taking the drug to avoid reaction (78%), and those who had achieved, without thalidomide, a stage of no reaction (32%). It seems that this is not related to sex and age. Those patients having polymorphic and necrotic erythema are more likely to continue taking the drug and it seems that this pseudo-dependence has been observed with the lower doses used in most cases, in Mexico, at the beginning of treatment. Four patients demonstrated a partial resistance to thalidomide and required higher doses over a long period in order to attain partial improvement.

It is concluded that comparative results are needed from other authors in order to more thoroughly evaluate the use of thalidomide for treatment of the reactional symptoms of lepromatous leprosy.—(Adapted from author's summary)

Terencio De Las Aguas, Jose. Treatment of leprosy with rifampicin and Isoprodian (L73A). *Lepr. Rev.* **46** Suppl. (1975) 165-168.

A total of 27 patients with lepromatous leprosy were treated: 13 with rifampicin, 600 mg per day; and 14 with rifampicin 600 mg per day plus Isoprodian, two tablets per day. Clinical improvement was excellent in both groups, bacteriologic improvement not so good, as judged by the Morphologic and Bacteriologic Indices. It was greater in the first group which had treatment for a longer period.

In general, tolerance was excellent. Reactions occurred in both groups but were more frequent in the second.—Author's Abstract

Vomstein, E. Preliminary report of a drug trial conducted at the Leprosy Relief Rural Center, Chettipatty, South India. *Lepr. Rev.* **46** Suppl. (1975) 207-213.

The drug combination (rifampicin + Isoprodian) therapy continues for 7 cases; it has been stopped for 19 cases—out of which 10 cases receive dapsone treatment ranging from 25 to 400 mg/week; the other 9 cases are without DDS subjected to further observation and follow-up.

All but two cases could again resume work which for some of them had not been possible for years gone by.

The experience gained till now with the drug combination therapy (rifampicin + Isoprodian) allows us to state that it no doubt means a noteworthy progress. This is especially so in those L and BL cases who never could tolerate and constantly reacted adversely to all the antileprosy drugs that are commonly in use.

These patients hitherto constitute an in-

surmountable medical and social problem.—Author's Abstract

Walter, J., Noussitou, F.M. and Sansaricq, H. The role of WHO in antileprosy drug trials. *Lepr. Rev.* **46** Suppl. (1975) 9-16.

The qualities and limitations of the drugs used in the treatment of leprosy are briefly outlined. The need for primary prevention tools as against present secondary prevention (chemotherapy) methods is stressed.

In the absence of effective primary prevention, the prospects of improving the present antileprosy chemotherapy are considered and the past and present WHO drug trials reviewed. The need for further efforts and future participation by WHO in drug trials is discussed.—Authors' Abstract

Waters, M.F.R., Pearson, J.M.H. and Rees, R.J.W. Sulfone resistance in leprosy. A review of 100 proven cases. *Lep- rologia* **19** (1974) 243-248.

An account is given of the first 100 consecutive proven cases of sulfone resistance detected in Malaysia between 1973 and 1974. Proof of resistance was clinical in 80 patients, and by drug sensitivity testing in mice in 93 patients; 73 patients were proved both clinically and experimentally, and there was no discrepancy between the two methods.

Clinical evidence of relapse due to the development of drug resistance occurred 5 to 24 years after commencing sulfone treatment. Low dosage favored the appearance of resistance, and regular treatment with DDS in full dosage is recommended. The attainment of negative smears is no test of the cure of lepromatous leprosy.—Authors' Summary

Immuno-Pathology

Barton, R. P. E. Lesions of the mouth, pharynx and larynx in lepromatous leprosy. *Lepr. India* **46** (1974) 130-134.

In a study of the mouth, pharynx and larynx in patients with lepromatous leprosy, the author working in Dichpalli, India de-

scribes his observations. The cooling of these regions by the flow of inspired air is a significant factor in providing suitable conditions for the multiplication of *Mycobacterium leprae*, hence the involvement of the palate in patients who are mouth breathers because of nasal obstruction.—W. H. Jopling (*From Trop. Dis. Bull.*)

✓ **Belopasov, V. V.** Vessel pathology due to leprosy (functional research). Scientific Works Lepr. Res. Inst. **8/13** (1974) 347-355. (In Russian)

This is a critical review of 96 published works, mainly by Russian authors, devoted to research results relating to capillary blood circulation, functional tests, the condition of the arterioles, thermography of skin, of main vessels in histopathologic section of the aorta-middle diameter vessels, arteriograms, the reduction of blood circulation, and oscillographies. The results of the complex study of central and peripheral blood circulation showed that the majority of patients had a spastic-atonic state of peripheral vessels and that changes in vessel tone were connected with the local pathologic process. The changes in vessel tone have a compensatory accommodating character, the collateral blood circulation having an especially important role. The functioning of collateral vessels is not always enough for the compensation of the pathologic damage because its development takes place against a background of debilitated nervous system regulation. The problem of the early diagnosis of vessel insufficiency and the detailing of the complex mechanisms which lie as the basis of functional disorders in the peripheral blood circulation system demand deep study.—(Adapted from N. Torsuev's summary)

✓ **Edwards, Rosa P.** An ultrastructural study of neuromuscular spindles in normal mice: with reference to mice and man infected with *Mycobacterium leprae*. *J. Anat.* **120** (1975) 149-168.

Mycobacterium leprae have been found within muscle spindles in mice, using electron microscopy, and in man, using light microscopy. Their mode of entry clearly is important. It may be via capsular cells, capillaries or nerves. For this reason muscle spindles from normal mice were studied by electron microscopy with special reference to the capsule and the relationship of it with capillaries and nerves, as well as details of the intrafusal fibers and capsular space. A fenestrated capillary was found between the capsular cell layers and outside the capsule in one spindle, and in another spindle both a fenestrated and a continuous type of a capillary were found between the capsular

cells; this may be of interest for pharmacological studies. However, the muscle spindles of the mouse were in the main similar to muscle spindles studied by other workers in man and other mammals.—Authors' Summary

✓ **Gajl-Peczalska, K., Lim, S. D. and Good, R. A.** B lymphocytes in primary and secondary deficiencies of humoral immunity. *Birth Defects* **11** (1975) 33-35.

The quantitative studies of B lymphocytes in peripheral blood have been performed in various forms of primary and secondary immunodeficiency disease in man. X-linked agammaglobulinemia was found to comprise two subtypes, one lacking B-cell population, the other showing low numbers of B lymphocytes. The absence of B cells in severe combined immunodeficiency was corrected by marrow transplants in three children. Cases of DiGeorge syndrome and lepromatous leprosy showed an absolute increase in numbers of B lymphocytes in peripheral blood, probably a compensatory mechanism in the marked deficit of T-cell population and function. The reconstitution of DeGeorge syndrome by fetal thymus transplant reversed the abnormally high percentage of B lymphocytes.—Authors' Abstract

✓ **Ganapati, R. and Desikan, K. V.** Simultaneous occurrence of lesions of different types of leprosy in a patient. A case report. *Lepr. India* **46** (1974) 148-151.

An Indian woman was admitted to the Central Leprosy Teaching and Research Institute, Chingleput, as a case of lepromatous leprosy, but detailed examination revealed a number of atypical skin lesions and thickened peripheral nerves. Histologic studies showed lepromatous changes in nodules and borderline changes in atypical lesions, and the authors suggest that multiple biopsies in patients presenting with clinically dissimilar lesions would contribute to a better understanding of the immunologic instability in borderline leprosy.—W. H. Jopling (*From Trop. Dis. Bull.*)

✓ **Han, S. H. and Kuo, S. L.** Ability of the leprous macrophage to accept cytophilic antibodies. *Chinese J. Microbiol.* **8** (1975) 59-63.

The ability of leprosy macrophages to accept cytophilic antibodies was not damaged. Blood macrophages derived from both types of leprosy formed rosettes with cytophilic antibody sensitized goat red cells. The rosette forming rates of tuberculoid (65%) and lepromatous macrophages (66.4%) were essentially the same as that of normal blood macrophages (66.8%).—Authors' Abstract

Joshi, B. N., Sabne, S. S. and Samson, P. D. Australia antigen in patients with leprosy. *Indian J. Med. Sci.* **28** (1974) 504-506.

Of 111 specimens of sera collected from leprosy cases, 63 from lepromatous leprosy and 48 from tuberculoid leprosy, 11.1% of lepromatous and 4.2% of tuberculoid leprosy showed the presence of Australia antigen. In lepromatous leprosy the incidence was found to be high in males between the age groups 31-40. Antibody was not detected in any of the patients.—Authors' Summary

Kharatiyan, A. M., Tsvetkov, V. V. and Kenzhebaev, A. Ya. Study of ferro- and erythrokinetics in patients with leprosy using radioactive iron (^{59}Fe). *Vestn. Dermatol. Venerol.* **4** (1975) 72-74. (In Russian)

Ferro- and erythrokinetics were studied in 17 patients with leprosy of various types using radioactive ferric citrate (^{59}Fe). The most marked changes in the kinetics under study were observed in cases of the disease complicated by anemia. It was established that an intensified hemolytic process played an important role in development of anemia in patients with leprosy.—Authors' English Summary

Kurilov, V. Ja. Investigation of tuberculoid leprosy skin infiltration in the active stage of disease. *Scientific Works Lepr. Res. Inst.* **8/13** (1974) 448-455. (In Russian)

The author performed microscopic research with ultrathin tissue sections by electron microscopy on a JEM-7 Tesla BS-613. The phagocytosed mycobacteria were localized in the primary phagosome of epithelioid cells which were then under the influence of the lysosomal enzymes which concentrate near the phagolysosomes. The quantity of lysosomes which are in or interacting with the phagosomes is large in the epithelioid cells. It may be that the main part of the

mycobacterial antigen disintegration takes place in the lysosomes of these cells. That is why intensive development of the Golgi complex structures takes place there. A high level of acid phosphatase activity in the epithelioid cells of active tuberculoid leprosy is revealed histochemically. There are more lysosomes in epithelioid cells in tuberculoid leprosy patients than there are in lepromatous Virchow cells. The latter are more osmophilic apparently due to the high content of lipids. Foamy structures are rare in the epithelioid cell lysosomes. The dimensions of the lysosomes are not more than 0.3 to 0.5 microns. The high activity of the lysosomes and of the Golgi complex is the result of the inducing influence of the phagocytized *M. leprae*. This may result from the macrophage-lymphocyte-epithelioid cell interaction.—(Adapted from N. Torsuev's summary)

Ocampo, Francisco Arellano. Algunos aspectos de la lepra de Lucio. [Some features of Lucio's leprosy.] *Leprolgia* **19** (1974) 219-224.

Sedimentation velocity is considerably increased, especially during Lucio's phenomenon. Serologic reactions for syphilis have increased titers.

The lepromin reaction, as in all lepromatous cases, is negative. Nevertheless, those patients who have already had Lucio's phenomenon had an early reaction in four to six hours, as can be seen with staphylococcus and streptococcus. It is known as Medina's reaction and is different from the Fernandez reaction.

From the histopathologic point of view, Lucio's phenomenon is characterized by superficial necrosis, dermis infiltrated by lymphocytes, and endocapilaritis obliterating vessels.—(Adapted from author's English translation)

Palande, D. D. The ulnar nerve in the lower arm in dimorphous leprosy: some observations. *Lepr. India* **46** (1974) 182-187.

This is a description of the findings in 38 leprosy patients at the Sacred Heart Hospital, Sakkottai, who required surgical exploration of one ulnar nerve because of intractable pain. External decompression was carried out in all cases and deep anterior transposition in some. There was no worsening of paralysis as a result of surgery, and

17 patients experienced complete relief of pain.—W. H. Jopling (*From Trop. Dis. Bull.*)

✓ **Torsuev, N. A. and Loguinov, V. K.** Leprosy of the internal organs. Scientific Works Lepr. Res. Inst. 8/13 (1974) 7-345. (In Russian)

This great monograph gives a detailed and critical review of the literature of the problem based on the authors' own observations during many years and a detailed bibliography containing 1,771 publications. A full description is given of the clinical picture, pathologic anatomy and histopathomorphology, histoenzymology, electron microscopy, biochemistry, pathophysiology, and the results of clinical and functional laboratory analysis. The monograph consists of the following parts: breathing organs (trachea, bronchi, pleura, lungs), heart and vessel system (heart, blood vessels, circulatory disorders), organs of digestion (esophagus, stomach, intestines, peritoneum, pancreas, gall bladder, liver, influence of contemporary antileprosy drugs on the liver), urinary organs (urether bladder, urethra, kidneys), amyloidosis, endocrine glands (hypophysis, epiphysis, thyroid gland, parathyroid, ovaries, menstruation cycle, reproductiveness, male sexual glands, adrenal gland, multi-glandular syndromes, gynecomastia), blood formation system (spleen, lymphatic glands, marrow, bacillemia, erythrocytes, leucocytes, physical and chemical characteristics of blood, blood groups, etc.). The monograph is illustrated by 27 original drawings, in-

cluding 9 from electron microscopy. The authors have done their best to elucidate as much as possible the problem of visceral leprosy, contemporary views on its pathogenesis and different stages of the disease. The knowledge of this material is necessary for individualizing antileprosy therapy, for choosing drugs, optimal dosages and combinations, methods of administration, the prescription of nonspecific stimulating drugs, for increasing effectiveness of treatment, and for preventing complications and side-effects.—(*Adapted from authors' abstract*)

Touraine, J. L., Kiskiss, D. F., Choi, Y. S. and Good, R. A. T cells in immunodeficiencies as evaluated by an antihuman T-cell serum. *Birth Defects* 11 (1975) 22-27.

An antihuman T-cell serum has been prepared in rabbits by injecting lymphocytes from a patient with Bruton-type agammaglobulinemia and absorption with cultured B-lymphoblast cells. Cytotoxicity of the antiserum was assayed with peripheral blood lymphocytes in the presence of rabbit complement and its specificity for T vs B cells was verified. This anti-T-cell serum killed 66% (range 49-78) of normal blood lymphocytes. In patients with Bruton-type agammaglobulinemia the percentage of cells sensitive to the antiserum was above normal (77-89%), whereas it was decreased in some patients with lepromatous leprosy or under antilymphocyte globulin therapy.—Authors' Abstract

Microbiology

✓ **Harris, E. B. and Prabhakaran, K.** Uptake of radioactive DOPA by *Mycobacterium leprae* *in vitro*. *Microbios* 12 (1975) 119-124.

Our previous studies demonstrated that *Mycobacterium leprae* contains a characteristic *o*-diphenoloxidase which converts a variety of phenolic compounds to quinones *in vitro*. This enzyme was not present in any other mycobacteria tested. The results reported here deal with the uptake and binding of radioactive DOPA by *M. leprae*. The leprosy bacilli incubated with tritium-labeled DOPA, readily took up the sub-

strate. The binding of DOPA by the bacilli was markedly inhibited by diethyldithiocarbamate. The organisms also bound tritiated norepinephrine. *Mycobacterium phlei* which does not oxidize phenolic substrates failed to bind DOPA. Cultures of melanocytes which contain *o*-diphenoloxidase took up tritiated DOPA. Catecholamine metabolism is known to be important in myocardial cells. Cultures of turtle-heart cells did not oxidize DOPA to quinone; however, these cells bound the labeled substrate. A cell line of fibroblasts derived from armadillo skin neither oxidized nor took up DOPA. The results indicate that, like melanocytes and turtle-

heart cells, *M. leprae* probably possesses specific receptor sites for the binding and subsequent metabolism of phenolic substrates.—Authors' Abstract

✓ **Kato, L., Ishaque, M. and Walsh, G. P.** Cytochrome pigments in *Mycobacterium leprae* isolated from armadillos (*Dasypus novemcinctus* L.). *Microbios* **12** (1975) 41-50.

The bacilli were isolated from granulomata harvested from armadillos. Cytochrome systems in whole cell suspensions as well as in cell-free extracts were examined spectrophotometrically. The intact cells contained cytochromes of the $a+a_3$, b and c type which were found to be present mainly in the reduced form. The cytochrome systems in cell-free extracts of *M. leprae* were in the oxidized form but contained the same type of cytochromes as the intact bacteria. The presence of cytochromes was easily detectable in the anaerobically-reduced (no substrate added) as well as in the dithionite- or succinate-reduced minus O_2 -oxidized difference spectra. The dithionite-reduced plus CO minus reduced difference spectra exhibited cytochromes a_3 and o as the carbon monoxide binding pigments.—Authors' Abstract

✓ **Murohashi, Toyoho and Yoshida, Konosuke.** Attempts to culture *M. leprae* in liquid media. *Acta Leprol.* **58** (1975) 5-21.

Deep culture of *M. leprae* was attempted using basic media prescribed for the semi-liquid agar media, which are being used in our culture experiments. In the cases of the first two strains, after about 18 and 25 weeks' incubation at 37°C, respectively, the liquid media became slightly turbid but homogeneously. Repeated examinations proved no contamination, and only acid-fast rods in special arrangement were detected. Bacterial suspension prepared from the culture elicited quite similar reactions in leprosy patients as Dharmendra's antigen. Accordingly, the acid-fast organisms existed in the liquid media making them turbid were identified as *M. leprae* immunologically. Subsequent cultures using three strains also represented turbid growth. Thus, it was shown that the culture of *M. leprae* in liquid media was successful.—(Adapted from authors' summary)

✓ **Nakamura, Masahiro.** Multiplication of *Mycobacterium lepraemurium* in cell-free liquid medium. 7. Pathogenicity of *M. lepraemurium* cultivated in NC-5 medium. *Lepro* **44** (1975) 7-12. (In Japanese)

It was demonstrated that *M. lepraemurium*, which was cultivated for 223 days at 30°C by the bacillary suspension method and for 172 days by the slide culture method, was infectious for susceptible mice. In both cases, the procedure of refreshing the culture medium resulted in stimulation of bacilli growth. In the slide culture method it was noted that the infectious abilities of the cultivated bacilli depended upon the number of living organisms, because the growth of bacilli was stimulated by a slide transfer procedure. On the other hand, no pathogenicity was demonstrated when the bacilli were cultivated for 64 days as the control in the EKP medium under the same condition.

However, the quantitative observation regarding the relationship between growth rate of bacilli and grade of pathogenicity illustrated that cultivated bacilli had reduced pathogenicity as compared to that of the starting material.—(Adapted from English summary)

✓ **Nakamura, Masahiro.** Multiplication of *Mycobacterium lepraemurium* in cell-free liquid medium. 8. Growth of *M. lepraemurium* in culture media which were preserved before inoculation. *Lepro* **44** (1975) 13-18. (In Japanese)

Stabilities of the NC-5 and NC-7 medium for growth of *M. lepraemurium* were studied. For this purpose these media were kept at 37°C and 4°C for one and two months. Using the slide culture method, *M. lepraemurium* were cultivated in a freshly prepared medium and preserved media. In order to observe the stabilities of the preserved media, the multiplication of *M. lepraemurium* in the preserved medium was compared to that observed in a freshly prepared one. The results obtained show that the bacilli multiplied equally in both freshly prepared and preserved media in the case of NC-5 medium; and in the NC-7 medium the dominant growth was observed in the medium which was kept for one month at 37°C, and the inferior growth in the medium preserved for two months at 37°C. Therefore,

it could be concluded that the NC-5 medium would be very stable for use.—(Adapted from English summary)

✓ **Nakamura, Masahiro.** Multiplication of *Mycobacterium lepraemurium* in cell-free liquid medium. 9. Effect of transfer of the smeared slide on the growth of *M. lepraemurium*. Lepro 44 (1975) 19-23. (In Japanese)

Experiments concerning the factors influencing the growth of *M. lepraemurium* smeared on slides and cultivated in NC-5 medium were carried out in the following ways.

1. Slide transfer group: a smeared slide was transferred to a freshly prepared medium at a definite interval.

2. Air exposure group: a slide was taken out and reintroduced into the same medium at a definite interval.

3. Stopper opening group: a rubber stopper was taken out and sealed again at a definite interval.

4. Control group: no treatment.

The growth of bacilli treated with the four procedures was compared. The most remarkable growth occurred in the air exposure group, and inferior growth occurring in the control group. From these results, it could be presumed that periodical exchange of air in a sealed culture medium might be necessary for the growth of bacilli.

In the experiments of bacillary cultivation, the suspensions of bacilli were inoculated and cultivated in 50 ml of NC-5 medium which were distributed to a 50 ml flask, 100 ml flask, and 200 ml flask, respectively. After two months' cultivation at 30°C, bacterial cells were collected by centrifugation and the wet weights of the sediments measured. The best yield of bacterial cells was obtained when the bacilli were cultivated in a 50 ml flask, and the poorest yield was observed in the case of the 200 ml flask. Therefore, it could be presumed that *M. lepraemurium* might multiply under a slightly anaerobic condition, rather than an aerobic one. From the results of the two experiments mentioned above, it could be emphasized that the growth of *M. lepraemurium* would unexpectedly depend upon the influence of air.—(Adapted from English summary)

✓ **Tanaka, Y., Kohsaka, K., Mori, T. and Shoji,**

K. Characteristics of *M. lepraemurium* Hawaii. Lepro 44 (1975) 1-6. (In Japanese)

M. lepraemurium Hawaii was grown on the modified Ogawa's yolk medium at 32°-37°C but not 45°C. Colonies were rough and creamy white. Pigment production in the dark and after exposure to light was not observed.

Amidase tests were performed with 12 substrates: acetamide, benzamide, urea, isonicotinamide, nicotinamide, pyrazinamide, salicylamide, allantoin, succinamide, malonamide, n-capramide and n-caprylamide. Amidase activities of nicotinamide, pyrazinamide, n-capramide and n-caprylamide were observed in *M. lepraemurium*, but those of the other eight substances were not detected.

In vivo bacilli of *M. lepraemurium* Hawaii grown in C3H mice and *in vitro* bacilli of *M. avium*, *M. intracellulare* and *M. xenopi* grown on Ogawa's egg medium had the same amidase activities as that of *in vitro* *M. lepraemurium* Hawaii.

Niacin test, catalase activity, heat stable catalase, nitrate reduction, heat stable phosphatase, Tween 80 hydrolysis, arylsulfatase, diamine oxidase and insusceptibility to ethambutol (5 µg/ml) were mostly the same as in the reports of Ogawa or Koseki.

From the facts described above, we may conclude that *M. lepraemurium* had characteristics most similar to *M. avium*, and that the heat stable catalase activity and multiplicity at 45°C can be used to differentiate between *M. lepraemurium* and *M. avium*.—(Adapted from English summary)

Tyrrell, D. A. J., McLauchlan, S. L. and Goodwin, C. S. The growth of some mycobacteria on cultured human tissues. Br. J. Exp. Pathol. 56 (1975) 99-102.

Mycobacterium tuberculosis, *M. xenopi* and *M. ulcerans* were grown on Lowenstein-Jensen egg medium. The growth was scraped from the slopes and suspended in saline. Drops (0.2 ml) of the suspension were added to small pieces of human fetal tissue, human adult fat, muscle and fibrous tissue, and incubated at 33°C. Sections of the formalin-fixed tissues were stained with hematoxylin and eosin and by the Ziehl-Neelsen and Triff methods.

Mycobacterium ulcerans grew on the

surface of fetal muscle, lung, kidney and skin tissue causing necrosis of the superficial cells. The organism showed a preference for the fibrous part of the skin rather than the epithelium. *M. ulcerans* and *M. tuberculosis* grew on adult striated muscle and fibrous (fascia) tissue but not on subcutaneous fat. It was shown that *M. ulcerans* and *M. tuberculosis* were able to stick to the muscle and fibrous tissue but not to the fat. *M. xenopi* was unable to stick to the tissues and this probably accounted for its failure to grow. The results are briefly discussed in relation to the mode of formation of Buruli ulcer.—P.A. Jenkins (*From Trop. Dis. Bull*)

✓ **Yang, Y. T., Lew, J. and Cho, S. H.** Growth experiment of *Mycobacterium leprae* in cultured mouse peritoneal macrophages.

Purification of viable *M. leprae* from biopsied lepromatous nodules by trypsinization method. *J. Korean Soc. Microbiol.* 7 (1972) 21-28.

A simple and effective procedure is described for semi-purification of viable *M. leprae* from biopsied lepromatous nodules by trypsinization and high-speed centrifugation. A unique characteristic of this method is a complete omission of conventional grinding or homogenization of minced lepromatous tissues prior to purification.

Inoculation of trypsin-purified preparation of *M. leprae* into foot pads and earlobes of Korean chipmunks (*Tamias sibiricus asiaticus*, Gmelin) resulted in apparent increases in total number of acid-fast bacilli per inoculated tissue 8 and 12 months after inoculation.—(*From Korean Med. Abstracts*)

Experimental Infections

✓ **Bergel, Meny.** Reproducción del *Mycobacterium leprae* inoculado a ratas alimentadas con carne vacuna en estado de putrefacción. [Multiplication of *Mycobacterium leprae* in rats fed with putrid cow meat.] *Rev. Lat. Am. Microbiol.* 17 (1975) 5-8. (In Spanish)

Described is the favorable growth of *M. leprae* inoculated into the leg of a rat after being fed meat flesh in a state of putrefaction. General considerations promulgated regarding the pathogenic mechanism through which the metabolites originated in the putrefactive decomposition of the flesh and which enhance the growth of *M. leprae*.

This fact is related to the spontaneous presence of mycobacteria largely in rodents which are found in dunghills, ports, or slum areas and whose nutrition comes near to the above-mentioned description rather than to what rodents usually eat in experimental laboratories.—(*Adapted from English abstract*)

✓ **Chang, Y. T. and Andersen, R. N.** Cultivation of mouse bone marrow cells: cytochemical studies of the granulocyte colony feeder cells. *J. Reticuloendothel. Soc.* 18 (1975) 34-43.

Current studies on the growth of granulocytes from bone marrow indicate that they

require a soft-agar medium and a cell colony stimulating factor. In a previous communication we described a simple colony-forming culture in which both the soft-agar and the colony stimulating factor were omitted. Instead, the colony appeared related to a large cell located beneath the cell cluster which was acting as if it were a "natural feeder cell." The present report deals with studies of the cytochemical reactions and phagocytic activity of the feeder cells in cultures of mouse bone marrow. Feeder cells exhibited phagocytosis, ferritin storage, silver impregnation, PAS reaction and nonspecific esterase, acid phosphatase and alkaline phosphatase activities. Feeder cells were identified in almost all the granulocytic colonies in the cultures and appeared to be large macrophages with alkaline phosphatase activity. Their possible relationship with the reticular cells of bone marrow is discussed.—Authors' Abstract

✓ **Collins, F. M., Congdon, C. C. and Morrison, N. E.** Growth of *Mycobacterium bovis* (BCG) in T lymphocyte-depleted mice. *Infect. Immun.* 11 (1975) 57-64.

BCG Montreal (10^6 viable bacilli) injected intravenously into adult thymectomized, irradiated, and bone marrow-reconstituted (THXB) C57B1 × C3H F_1 hybrid mice in-

duced a progressive systemic infection which killed 95% of the animals within 60 days. Control mice infected with this dose of BCG did not die. The infected THXB mice failed to develop detectable levels of tuberculin hypersensitivity although they did show considerable Arthus (3 h) reactivity. The BCG-infected THXB mice lost weight progressively, and the root spleen and root lung indices increased substantially as the infection proceeded. None of the THXB mice developed an antibacterial immune response to the systemic BCG infection; and this was reflected by the continued persistence of macroscopic lung granuloma in these animals. The BCG-infected control mice developed as many surface tubercles as did the THXB animals, but the granulomas rapidly regressed in size and numbers in the normal mice. The lung changes correlated with the amount of tritiated thymidine incorporated by the lung cells in the later stages of the BCG infection. T cell depletion depressed the early splenic peak normally seen in BCG-infected controls, but, on the other hand, there was a progressive increase in lung counts in the THXB mice as the infection progressed and this late peak was not seen in the control animals. The significance of these findings is discussed in relation to the development of antituberculous immunity by BCG-infected mice.—Authors' Abstract

✓ **Favila, Luis and Jimenez, Luis.** *In vitro* studies of the humoral immune response

of mice infected with *Mycobacterium lepraemurium*. Rev. Lat. Am. Microbiol. **17** (1975) 101-103.

The humoral immune response to sheep erythrocytes by cultures of cells from mice infected with *M. lepraemurium* was studied by *in vitro* primary immunization, measuring the response in antibody forming cells for the specific antigen. In comparing responses obtained in cells from infected or from normal mice, it was found that cells from infected animals showed a marked decrease in their responding capability, which correlates well with the decrease observed in *in vivo* experiments. In the same system, no inhibition of the response of normal cells was found when these cells were incubated in the presence of serum from infected animals. From this, it was concluded that no inhibitory factors are present in the serum and that the decreased response is due to defect in the cell function.—Authors' Summary

✓ **Pearson, John M. H.** A simplification of the mouse foot pad infection using *Mycobacterium leprae* from skin scrapes. Lepr. Rev. **46** (1975) 105-107.

In lepromatous leprosy bacilli can be obtained from skin scrapes in sufficient numbers for mouse foot pad inoculation. This technic is simpler than biopsy, particularly suited to field conditions and the method of choice in the investigation of patients suspected of developing drug resistance.—Author's Summary

Rehabilitation

✓ **Dwivedi, M. P.** A study of medico-social problems of cured leprosy cases in the Pandri village of Raipur District, M.P. Lepr. India **46** (1974) 245-252.

Although this study was made five years ago in the State of Madhya Pradesh, India, it is unfortunately still relevant not only to other areas of the Indian subcontinent but also to Southeast Asia, South America and Africa. The subjects were 132 families, comprising 286 people, living near a leprosy hospital. Altogether 222 of them, having had treatment of leprosy, were now regarded as "cured." They had been rejected by their

relatives, denied a welcome and work by their fellow villagers, and existed in single person or small family units in a typical Indian village (like the "villages de post-cure" of francophone Africa).

At least three quarters of them were classed as beggars; and only 15% were literate. Addiction to hemp, tobacco and alcohol was very common, tobacco being the principal addiction of the women. Over half of the residents who had had leprosy retained some degree of disability which was often severe and usually stigmatizing.

The medico-social problems posed by this village of leprosy beggars, typical of many,

are briefly and objectively described. The deep-seated social rejection of deformed leprosy sufferers, which leads to a feeling of apathy and inertia on their part, may be perpetuated by institutionalization and by unscientific and inhuman attitudes both to leprosy and to its victims.—S. G. Browne (*From Trop. Dis. Bull.*)

✓ **Jennings, W. H., Joshi, P. V., Pandey, S. D., Mehta, J. M. and Antia, N. H.** A socio-economic study of leprosy surgical cases. *Lepr. India* 47 (1975) 186-189.

Previous social and economic status of the patient is the most important factor in rehabilitation. Surgery was directly responsible for the social and vocational rehabilitation of only 17 of 206 patients. It is interesting to note that out of 58 cases with severe deformities, almost half (24) were never dehabilitated in any way, while a further 12 were economically well settled despite ostracism.

Surgery helped in the social but not economic rehabilitation in 21 cases, and in the economic rehabilitation of 22 cases.

The number of those unemployed after surgery because of ostracism (41) is almost the same as those unemployed due to lack of aptitude (40), and in all 206 patients, only 4 were unemployed due to physical unfitness.

The number of those dependent on institutions in some way (42) leads one to believe that long hospitalization tends to deprive patients of their aptitude for self-support. And, unfortunately, there are many institutions in India which encourage this.—(*Adapted from authors' conclusion*)

✓ **Ranney, Donald A.** Rehabilitation goals in leprosy surgery. *Lepr. India* 46 (1974) 253-257.

Writing out of his experiences in Karigiri, South India, the author summarizes the physical, socio-economic and psychological problems besetting patients suffering from leprosy. About a third of the patients had some degree of disability due to neglected leprosy, already present when they first came for diagnosis and treatment—an indication of the inadequacy of case finding procedures. Lagophthalmos resulting from upper facial palsy, claw hand and ulcerated feet point the obvious moral.

The author rightly insists on the importance of appearance as well as of function if a patient with established deformity is to be accepted back into his family and community as a working member. Surgical correction or removal of obvious stigmatizing lesions is one of the ways to achieve this. Education in the use of insensitive extremities, retraining at one of the special centers available, the provision of tools and appliances with specially adapted handles may all help the exleprosy patient to face life anew and help the community to accept him.

Fear and rejection are the psychological factors that explain much of the meager results accruing from many leprosy programs. The patient with multiple deformities may need a succession of skilled surgical interventions before he is able to take his place in society. [In the face of this rather grim picture of the difficulties encountered in attaining goals enumerated, the modern insistence of prevention of deformity by early detection and adequate treatment assumes a greater importance.]—S. G. Browne (*From Trop. Dis. Bull.*)

✓ **Rotberg, Abrahao.** The ten enemies of prevention of Hanseniasis are related to "leprosy." A psycho-social phenomenon. *Lep- rologia* 19 (1974) 281-285.

Leprosy is not a disease like any other, but a chain of fantasies, superstitions, stigma, sensationalism, ignorance, fear, rejection and infamous terminology—around a core of signs and symptoms of the somatic disease. One of the consequences is that we are still case finding instead of seeing patients and contacts finding us. The ten enemies of prevention are: 1) latent segregationism; 2) hesitant integrationism; 3) the infamous pejorative "leprosy"; 4) sensationalism; 5) misguided charity; 6) psycho-social amateurism; 7) non-attentive education; 8) low salaries and lack of personnel; 9) obsolete legislation; and 10) deficient teaching.

Our urgent task is to break down the chain which confines the signs and symptoms caused by Hansen's bacillus and which makes of them "a disease very different from any other." We must ask help from authorities and researchers in religion, folklore, literature, art and in the historical, linguistic, psychological, educational and social sciences, to handle this part and free

us to cope with Hansen's bacillus and the physical disease it causes.

The Council of the International Leprosy Association acknowledged the inconvenience of the word "leprosy" in some countries and freed them to decide on their own terminol-

ogy (Tenth International Leprosy Congress, Bergen, 1973). No Latin American country should lose this opportunity to rid itself of that infamous pejorative, and start breaking the psycho-social chain.—(*Adapted from author's summary*)

Epidemiology and Prevention

✓ **Amblard, P., Ambroise-Thomas, P., Desire, C., Gout, M., Monroe, M. and Schneider, R.** Aspects actuels de la lèpre à la Martinique. [Aspects of leprosy in Martinique.] Bull. Soc. Pathol. Exot. **68** (1975) 164-171. (In French)

Altogether my observations agree with the facts reported by other authors. Two data however should be pointed out. In spite of the progress in its demonstration, leprosy remains frequent in Martinique, with 47% being lepromatous and 25% tuberculoid. Leprosy in the West Indies constitutes an intermediary level between African leprosy (60% tuberculoid) and South American leprosy (60% lepromatous).—(*Adapted from author's English summary*)

✓ **Brubaker, Merlin L.** Leprosy in the Americas. *Leprolgia* **19** (1974) 168-177.

The origins of leprosy in the world are obscure. In the Americas, however, the disease was introduced by the explorers and settlers of the New World. Thus the disease depended on both the introduction of people with leprosy and susceptible populations to produce pockets of endemic disease throughout the hemisphere.

Virtually no cases have been observed among indigenous people. However, there are nearly 200,000 cases registered in the Americas, and the World Health Organization has estimated that roughly 350,000 cases actually exist. An average of 72% of leprosy cases in each country of the hemisphere are reportedly under control. Eighty-five percent of all registered cases reported are in five countries; 61% in Brazil alone. Lepromatous cases represent approximately 50% of all cases reported. Control programs in the Americas vary from minimal programs to very good ones with resulting validity of the data reported depending on the effectiveness of the control program.

A hemisphere-wide approach to control

is being implemented by the establishment of the PAHO/WHO International Center for Training and Research in Leprosy and Related Diseases in Caracas, Venezuela. Collaborating centers throughout the hemisphere are expected to promote more uniformity of control programs and data collection, by means of consultant exchanges, field studies, and the training of personnel.—*Author's Summary*

Davey, T. F. Common features in rapidly declining leprosy epidemics. *Lepr. Rev.* **46** (1975) 5-8.

In a wide-ranging and thoughtful editorial, Davey attempts to uncover important common features that appear to be operative in successful leprosy control programs. Certain hypothetical possibilities are dismissed for lack of objective evidence.

Davey considers that strain differences in pathogenicity of *Mycobacterium leprae* may possibly afford an explanation of some epidemics that seemed to be short-lived, while repeated exposure of a virgin population to the organism might encourage a shift towards tuberculoid leprosy by inducing acquired resistance. The influence of tuberculosis on susceptibility to leprosy infection is probably complex and variable. No direct link between malnutrition and leprosy has been convincingly demonstrated.

Home segregation of leprosy sufferers probably played some part in the control of the considerable leprosy endemic in Norway a century and more ago, as a modified form of isolation probably did in Nauru and eastern Nigeria.

The effect of treatment by injections of hydnocarpus oil, in Davey's opinion, lay less in its direct therapeutic effect than in the popularization of leprosy treatment that it heralded. At least, patients were convinced that something was being done for their disease and somebody was interested in

them. The modern counterpart of isolation is sulfone therapy which renders leprosy patients noncontagious after a few months of treatment. The other determining factor in the success of all too few leprosy campaigns is large-scale cooperation of the public as well as those suffering from leprosy.—S. G. Browne (*From Trop. Dis. Bull.*)

- ✓ **Depasquale, G.** The leprosy eradication program of Malta. *Lepr. Rev.* **46** Suppl. (1975) 215-217.

An eradication program ideally requires a closed community with close collaboration from all authorities concerned in order to enable the examination of all known, registered cases; early detection of cases and starting therapy with an effective, quick-acting medication to reduce the possibility of dissemination of the disease; and the facility to follow up the patients on a long-term basis. These requirements having been satisfied in the Malta Program, one has to carry on with observation of all patients for the next few years in order to evaluate fully the results achieved.—Author's Abstract

- ✓ **Kadantzev, N. D.** Some factors influencing the spread of leprosy. *Scientific Works Lepr. Res. Inst.* **8/13** (1974) 415-423. (In Russian)

On the basis of a critical review of the literature and his own material, the author concludes that social factors such as population migration during wars, colonization and development of trade links, low economic, hygienic and cultural levels of life contribute to the rising frequency of transmitting leprosy infection from human to human. Unfavorable natural conditions and insufficient protection from these conditions lowers the natural resistance of the host and intensifies susceptibility to leprosy infection. High [low?—Ed.] immunity makes it easy for air-droplet transmission of leprosy. The high level of morbidity in some regions of the world may be explained by the combined action of unfortunate social and climatic factors.—(*Adapted from N. Torsuev's summary*)

- ✓ **Millan, J. and Le Corroller, Y.** Le dépistage systématique dans la lutte contre la maladie de Hansen: résultats obtenus en Guadeloupe dans le secteur de Grande-Terre.

[Systematic case-finding in the leprosy campaign. Results obtained in Guadeloupe in the Grande-Terre sector.] *Med. Afr. Noire* **21** (1974) 695-703.

The authors summarize the results obtained through an intensive case-finding program in a sector containing about half of the total leprosy patients in a country having a third of a million inhabitants and a leprosy prevalence rate of 5.7 per 1,000.

As regular whole-population surveys are impracticable, the program depends upon the application of widely accepted principles to ensure that leprosy is diagnosed as early as possible. General practitioners discover in their regular clinics about half the total number of leprosy patients diagnosed annually. Cooperation with other doctors who regularly examine selected populations (i.e., work-people) is another fruitful source of new cases. The examination of contacts should, it is admitted, be more extensive and better organized than it is. The most hopeful feature of the program was the introduction of a mobile team, which concentrated on the examination of schoolchildren; 52% of new cases were discovered through this activity, and these included 46% of new cases of lepromatous leprosy. With the lowering of the average age at diagnosis, the numbers of schoolchildren suffering from self-healing forms of leprosy have increased, but the authors consider that the efforts are justified if some patients with early lepromatous or near-lepromatous leprosy are thereby brought to light.—S. G. Browne (*Adapted from Trop. Dis. Bull.*)

- ✓ **Molesworth, B. David.** Results of Leprosy Control Project, Malawi. *Lepr. Rev.* **46** Suppl. (1975) 149-152.

An intensive leprosy control project was conducted in Southern Malawi from 1966 to 1973. Using standard dapsone therapy, the effect on the bacilliferous cases was assessed and has produced a very considerable impact.

From the figures it is obvious that the time factor is long and, therefore, any shortening of this period, practical for mass campaigns, would be of the greatest importance.—(*Adapted from author's abstract*)

- ✓ **Payet, M., Coulaud, J.-P., Pasticier, A. and Saimot, G.** *Maladies tropicales et para-*

sitaires. [Tropical and parasitic diseases.] *Annee Praticien* **24** (1974) 4495-4504. (In French)

This is a useful cursory review of recent developments in tropical medicine intended primarily for the physician in general practice. The number of leprosy patients is said to have increased in France in the last few years because of: 1) arrival of French citizens from the Antilles, 2) repatriation of French citizens from overseas, and 3) immigrant workers, mostly from Portugal and black Africa. The significant developments in leprosy reported at the Bergen Congress in 1973 are mentioned.—W. M. Meyers

- ✓ **Sharma, S. N. and Saxena, V. B.** An epidemiologic study of rural leprosy problems in Dharsiwa block of Raipur district (M.P.). I. Prevalence pattern. *Lepr. India* **46** (1974) 157-171. II. Transmission trends. *Ibid.* 172-181.

I. A large number of people (8,738), comprising 88% of the population, were examined for leprosy in a district of Madhya Pradesh; 38 cases of leprosy were discovered, a prevalence rate per 1,000 of 4.34. Twenty-four percent of the patients had lep-

romatous leprosy and 45% of the others had nerve involvement; bilateral involvement was common. The prevalence in children was 26 per 1,000. Nine tables give details of the survey.

II. Of 92 villages in which there were patients with leprosy, 48 had patients with lepromatous leprosy. Seven tables give analyses such as the age of onset of leprosy, history of leprosy in the family, result of lepromin test, and ABO blood groups.—C. S. Goodwin (*Adapted from Trop. Dis. Bull.*)

- ✓ **Sobral, Francisco da Cruz and Picoto, A. Silva.** Factores geograficos na epidemiologia da lepra no Timor Português (Oceania). [Geographic factors in the epidemiology of leprosy in Portuguese Timor (Oceania).] *Leprolgia* **19** (1974) 192-195. (In Portuguese)

The authors have studied the rate distribution of leprosy in Portuguese Timor in relation to the orological profile of the island. The authors conclude that the rate distribution of the disease is altitude-dependent and so they found the highest incidence of the disease in the low lands, while in the mountains the number of cases was very restricted.—Authors' English Summary

Other Mycobacterial Diseases and Related Entities

PAPUA NEW GUINEA MEDICAL JOURNAL **17** (1974) 126-159. Symposium on *Mycobacterium ulcerans*.

The first six papers in this issue of the journal form a short symposium on *Mycobacterium ulcerans* infection. F. Fenner reviews studies on the organism, initially called "the Bairnsdale bacillus" after the district in Australia in which it was first isolated from an ulcer on a child's leg. A. J. Radford contributes the following three papers on *M. ulcerans*: epidemiology; clinical presentation, histopathology, treatment and prevention; *M. ulcerans* infection in Papua New Guinea. In the first two of these papers he reviews the distribution and epidemiology of the condition, and the clinical and other aspects, comparing the picture in Papua New Guinea with that elsewhere, particularly Uganda. In the third paper he provides

more detail of the infection as it is seen locally, based on a review of 112 cases. A simple surgical technic involving curettage has been found to give the best results; antibiotics and other drugs, including clofazimine, have not proved helpful. D. G. Lytton and J. Lavett describe, for the first time, the pathology of *M. ulcerans* infection in Papua New Guinea, and D. J. Dawson outlines the diagnostic methods suitable for local use.

Little has been published on this infection in Papua New Guinea and this group of papers, which should be read in the original by those interested, is a valuable addition to the literature.—F. I. C. Apter (*Adapted from Trop. Dis. Bull.*)

- Radford, Anthony J.** *Mycobacterium ulcerans* in Australia. *Aust. N.Z. J. Med* **5** (1975) 162-169.

The epidemiology of 39 case reports of infection with *Mycobacterium ulcerans* published during the past 25 years in Australia is presented. A review is made of the laboratory findings of the strains found in Australia and of the contribution of Australian workers to the description, treatment and prevention of this disfiguring disease.—(From Trop. Dis. Bull.)

U.S. Department of Health Education and Welfare. Leprosy-like disease in wild-caught armadillos—Louisiana. Morbidity and Mortality Weekly Reports **25** (1976) 18 & 23 (Jan. 24).

Fourteen 9-banded armadillos trapped in southern Louisiana in 1974 and 1975 were found to have infection with acid-fast bacilli similar to *M. leprae*. Completed postmortem examination of seven of these animals revealed mycobacterial invasion of dermal nerves and attempts to culture the mycobacteria on 7H10 and Lowenstein-Jensen media were unsuccessful. Lepromin prepared from the armadillo tissues gave reactions in tuber-

culoid and lepromatous patients at 28 days that were identical to the response to standard lepromin. The bacilli were identical to *M. leprae* by immunofluorescent staining and to pyridine extractability of acid-fastness.—O. K. Sinsnes

Walsh, G. P., Storrs, E. E., Burchfield, H. P., Cottrell, E. H., Vidrine, M. F., and Binford, C. H. Leprosy-like disease occurring naturally in armadillos. J. Reticuloendothel. Soc. **18** (1975) 347-351.

Seven armadillos recently captured from the wild in southern Louisiana were found to be afflicted with a disseminated disease involving several vital organs and various nerves. Diseased tissues contained large numbers of acid-fast organisms resembling mycobacteria. Attempts to grow the organism on standard mycobacterial media have failed. Studies have been initiated to compare the organism with *Mycobacterium leprae*, the causative agent of human leprosy.—Authors' Abstract