

Abstracts

The following Abstracts are reprinted, with permission, from *Tropical Diseases Bulletin* 1974, Oct.-Dec.

1. **PATTYN, S. R. The problem of cultivation of *Mycobacterium leprae*: a review with criteria for evaluating recent experimental work.** *Bull. Wld Hlth Org.*, 1973, v. 49, No. 4, 403-10.

"Some criteria are presented to help evaluate papers appearing in the literature claiming successful cultivation of *Myco. leprae* either in the absence or in the presence of tissue-cultured cells. Recently, electron microscopic studies have definitely shown *Myco. leprae* to belong to the genus *Mycobacterium* and its division to occur through transverse section. A survey is given of the mycobacterial strains isolated in the last 10 years from leprosy lesions. These strains belong to taxonomically different species and cannot be considered to be *Myco. leprae*. No substantial claim was made concerning the *in vitro* growth of *Myco. leprae* and the application of the tissue culture technique has been equally disappointing. The view is expressed that progress towards the *in vitro* cultivation of *Myco. leprae* can be made only as a result of increased knowledge about the intracellular environment and the metabolic activities of this organism, to be obtained by the application of modern biochemical and histochemical techniques."

[There are 116 references.]

2. **OLITZKI, A. L. The relations between morphological changes of *Mycobacterium leprae* and its multiplication in different media.** *Boll. Ist. Sieroter. Milan.*, 1974, v. 53, No. 1, 24-31.

Elongation and multiplication of *Mycobacterium leprae* in cell-free media was investigated. No changes were noted on incubation with amino acids but the addition of extracts of *Myco. smegmatis* caused marked elongation followed, after about two months, by division. The effect of mycobacterial extracts was inhibited by the addition of several amino acids, notably tryptophan, and was enhanced by glutamic acid and by cysteine. High concentrations of streptomycin were inhibitory but at low concentrations some stimulation was noted. The results suggest that the non-cultivability of *Myco. leprae* may be due as much to the presence of inhibitors in media as to the lack of growth-promoting substances.

S. Fletcher

3. **MIRANDA, R. N. & MIRANDA, R. P. G. Uma introdução à odonto-leprologia. Lepra: suas manifestações buco-maxilares no adulto e na criança. [An introduction to odonto-leprology. Leprosy: its buccal and maxillary manifestations in adults and children.]** [In Portuguese pp. 3-33; numerous illustrations. In English pp. 35-67.] 1973. Centro de Estudos Leprológicos "Souza Araujo" da Universidade Federal do Paraná, Curitiba, Brazil.

To most English-speaking readers who may be attracted by the title and pretensions of this short monograph, the real "meat" is contained in pages 61 to 66; the short paragraphs reporting original work on "leprotic gingivitis" and "dental leprosy" will repay reading. The authors have demonstrated *Mycobacterium leprae* in the dental pulp in patients with lepromatous leprosy, and refer to reports of the bacilli in periapical granulomata. Leprosy infection of the gums, which incidentally showed impaired superficial sensitivity, was demonstrated by the presence of leprosy bacilli in great numbers in material removed by the scrape-incision technique. The authors make some play of the absence of any stratum in the gingival submucosa corresponding to Unna's band in the dermis.

Infection of the teeth with leprosy bacilli is shown by a specific pulpitis, which may be suspected if the teeth (especially the upper and lower incisors) have a reddish tinge. *Myc. leprae* have been found also in the small dentine canals and in the vicinity of the odontoblasts.

The rest of the text gives a fair introduction to leprosy intended for medical students.

The clinical and bacteriological photographs are of poor quality.

S. G. Browne

4. RUSCHER, H., FAYE, I., LANGUILLON, J., SARRAT, H., OUDART, J. L. & CARNUS, H. Intérêt d'une stimulation immunitaire par B.C.G. itératif dans le traitement de la lèpre lépromateuse. Nouveau bilan chez treize malades. [The effect of immunity stimulation in lepromatous leprosy by means of repeated BCG vaccination. Outcome of treating 13 patients.] *Bull. Soc. Méd. Afr. Noire Lang. Fr.*, 1973, v. 18, No. 4, 470-76. English summary (7 lines).

In the hope of favourably modifying the immune response in a group of 13 patients suffering from lepromatous leprosy, the authors gave fortnightly injections of BCG vaccine for 12, 24 and 30 months respectively to three patients who had no other treatment, and to 10 patients who were also given sulphonamides.

From these small numbers the authors conclude that BCG vaccination was responsible for the improvement that was attested on clinical, histopathological and immunological grounds.

S. G. Browne

5. SAIKAWA, K. [The epidemiological study on leprosy in Okinawa island. The first report: on the newly detected patients by each year.] *La Lepro*, v. 43, No. 1, 52-62. [In Japanese.]

The English summary appended to this paper is as follows:—

"In 1931 the leprosy control program by segregation policy came into operation by local Government according to the Leprosy Prevention Law in Japan. Since then, in 1961 the Ryukyu Government issued the new law to change the policy for leprosy control and started out-patient treatment for the patients at several places in 1962.

"From 1931 to 1972, about 3735 leprosy cases have been detected and controlled during 41 years. On the number of the newly-detected patients by each year the analysis has been done epidemiologically by leprosy incidence rate, lepromatous ratio, lepromatous incidence rate, age and sex. The conclusions are as follows:

"1. During the first 5 years when out-patient treatment came into operation since 1962, the number of newly-detected patients has increased from 70 cases in 1962, to 173 cases in 1967. Then the number has decreased from 173 to 70 in 1972 during the 2nd 5 years. The increase during the first 5 years is mainly due to the changed policy on leprosy control. The patients are willing to gather to O.P.D. for treatment. The decrease during the 2nd 5 years was due to the success of leprosy control policy, because many slight and early cases were detected in O.P.D. or other medical institutions, public health units, centers, general hospitals and private practitioners.

"2. The out-patient treatment of leprosy patients in Okinawa Island for ten years proved to be successful for leprosy control."

[14 detailed tables and figures, in English, are provided.]

6. MEDFORD, F. E. **Leprosy in Vietnam veterans.** *Arch. Intern. Med.*, 1974, v. 134, No. 2, 373-9.

This is believed to be the first report of leprosy contracted by a U.S. serviceman while on duty in Vietnam. The patient, aged 30 years, had served in Vietnam from March 1967 to March 1968, and for 11 of the 12 months had been on a patrol boat with two other U.S. servicemen and six Vietnamese. He was first seen in March 1972 complaining of numbness and tingling, of one year's duration, of the fifth metacarpophalangeal joint of the right hand. Nine months later similar sensations developed in another joint in the same hand, and a nodule developed on the ulnar aspect of the right wrist. A cord-like structure on the back of the hand was shown to be a

thickened dorsal cutaneous branch of the ulnar nerve, and specimens of an excised portion were sent to two experienced laboratories. One reported "tuberculoid leprosy, leprosy of ulnar nerve, acid fast bacilli present": the other reported "nerve trunk: granulomatous neuritis", with the comment "this specimen could certainly represent tuberculoid type of leprosy; in the absence of organisms, would be compatible with this particular diagnosis". Apart from his service for 12 months in Vietnam the patient had never left Virginia.

F. I. C. Apter

7. AMBROSE, E. J., ANTIA, N. H. & KHONOLKAR, S. R. Uptake of radioactive DOPA by *Myc. leprae*. *Nature*. London, 1974, June 28, v. 249, 854-5.

Biopsy specimens from untreated patients with bacilliferous leprosy were homogenized and drops of the suspension added to a "smear of warm agar on coverslips and incubated for various periods" up to 48 hours in the presence of $5 \mu\text{Ci ml}^{-1}$ of ^3H -DOPA. An autoradiograph shows bacilli labelled with radioactive DOPA. "Granular bacilli were unlabelled." With the use of scintillation counting "preliminary experiments measuring uptake of ^3H -thymidine by *Myc. leprae* by this method have also led to promising results", which the authors conclude may indicate the rate of multiplication of *Myc. leprae*.

C. S. Goodwin

8. ETEMADI, A. H. & CONVIT, J. Mycolic acids from "noncultivable" mycobacteria. *Infection & Immunity*, 1974, v. 10, No. 1, 236-9.

"Chromatographic analysis, coupled to mass spectrometry with a high-resolution mass spectrometer, of materials isolated from skin lesions of patients with lepromatous leprosy allows the recognition of characteristic mycobacterial products, mycolic acids. This finding indicates that the 'noncultivable' bacteria responsible for leprosy are mycobacteria."

9. NATH, I., CURTIS, J., BHUTANI, L. K. & TALWAR, G. P. Reduction of a subpopulation of T lymphocytes in lepromatous leprosy. *Clin. Exp. Immunol.*, 1974, v. 18, No. 1, 81-7.

"A reduction in number of a subpopulation of T lymphocytes was noted in lepromatous leprosy cases with high bacillary load. Tuberculoid and treated lepromatous patients, who were bacillary negative had normal levels of these cells. B-cell numbers were high in lepromatous patients irrespective of treatment and bacillary load."

10. PURTILO, D. T., WALSH, G. P., STORRS, E. E. & BANKS, I. S. Impact of cool temperatures on transformation of human and armadillo lymphocytes (*Dasyproctus novemcinctus*, Linn.) as related to leprosy. *Nature*. London, 1974, March 29, v. 248, 450-52.

Transformation of armadillo lymphocytes by phytohaemagglutinin (PHA) was reduced by 66% when the lymphocytes were cultured at 33°C compared with transformation at 37°C , and there was a "marked reduction" at 33°C with transformation by sonicated *Mycobacterium leprae*. Lymphocytes from armadillos inoculated with *Myc. leprae* but not showing gross infection were "more responsive" to sonicated *Myc. leprae* than normal lymphocytes, but lymphocytes from two grossly infected armadillos were not more responsive, suggesting intrinsic or acquired anergy to *Myc. leprae*.

Transformation of human lymphocytes by PHA and sonicated *Myc. leprae* was reduced markedly when the lymphocytes were cultured at 33°C compared with 37°C . Lymphocytes cultured at 28°C and then at 37°C regained 50% of their reactivity.

The authors conclude that the cool body temperature of the armadillo is probably responsible for its immune incompetence to *Myc. leprae*.

C. S. Goodwin

11. BERGEL, M. Cultivo e inoculacion del *Mycobacterium leprae* en tejidos y organos en estado de necrobiosis y necrosis. [Culture and inoculation of *Mycobacterium leprae* in tissues and

organs in a state of necrobiosis and necrosis.} *Revta Lat.-am. Microbiol.*, 1973, v. 15, No. 4, 181-6. English summary (6 lines).

During attempts at cultivating *Mycobacterium leprae* it was observed that low temperatures were favourable; tissues in necrosis or necrobiosis are generally at a lower temperature than normal. The Virchow cell, in which leprosy bacilli reproduce, is one with a low metabolic rate and in granulomatous leprosy there are many cells in a necrobiotic condition. The leprosy bacilli have very low metabolic requirements. ISIKAWA (*Lepro*, 1967, v. 36, 238) showed that only sufferers from lepromatous leprosy with positive microscopic findings have a high putrescine blood content; this could be a leprosy metabolic product.

Growth of leprosy bacilli in the footpads of rats is associated with the presence of muscle metabolites present in necrotic conditions fostered by a "prooxidant" diet, deficient in vitamin E. When lepromatous tissue was grafted on to rats on a special diet, reproduction of the bacilli occurred actively in the necrotic areas of the insert.

While all *Myco. leprae* inoculated intratesticularly in a normal rat will disappear in six months, a similar inoculum in testicles which have been selectively necrotized by means of a subcutaneous injection of cadmium chloride is followed by active reproduction of the bacilli. In this case, to the necrotic factor, a haemorrhagic factor is added, with the setting free of a great deal of haemic iron, leading to an oxidizing state *in situ*.

The author lists 17 experiments, based on the induction of necrotic conditions in various tissues and organs, which he is conducting to observe development of *Myco. leprae* and which include transplantation of organs within the same animal, and preservation of such tissue at 0°C, 37°C and at room temperature. These extensive experiments are based on the observations referred to in the introductory paragraphs.

The organs and tissues most favourable for the growth of *Myco. leprae* are muscle, epididymal fat and skin. All these experiments must be carried out under strictly sterile conditions to ensure an aseptic necrosis. As controls one must use similar organs or tissues which after inoculation are kept in optimal conditions with normal vascularity, metabolism and nutritional conditions. There are other methods of producing visceral necrosis without the death of the animal, including the use of myotoxic aminoquinoline, induction of kidney necrosis with uranyl nitrate, and haemorrhagic infarcts produced by ligaturing the vessels.

E. Agius

12. MUÑOZ RIVAS, G. Micobacteriaceas ambientales en armadillos colombianos. [**Environmental mycobacteria in armadillos in Colombia.**] *Revta Invest. Salud Públ.*, 1973, v. 33, Nos 1/2, 61-6. English summary.

Mycobacteria were cultivated from the mesenteric glands of 30 out of 35 healthy armadillos (*Dasybus novemcinctus* and *D. sabanicola*) dissected. These animals carried ticks (*Amblyomma cayennense*) and, out of six lots of these studied, five gave a positive mycobacterial culture. Artificially inoculated armadillos were also studied: three were inoculated with leprosa material from hamsters which had been injected with *Mycobacterium leprae*, three with murine leprosy and four with human leprosy. In one of those inoculated by mouth with murine leprosy the mesenteric glands became enlarged with the presence of acid alcohol fast bacteria which, when inoculated in mice, produced murine leprosy. Three of those inoculated with human leprosy were positive and one negative.

Armadillos feed on coleopteran larvae, earthworms and acari mixed with soil and they stay in, and drink, stagnant water containing algae. Saprophytic mycobacteria could be isolated from almost all these foods. Environmental mycobacteria can occur together with *Myco. leprae* and *Myco. lepraemurium*.

E. Agius

13. CONVIT, J. & PINARDI, M. E. **Leprosy: confirmation in the armadillo.** *Science*. Washington, 1974, June 14, 1191-2.

"Bacteria isolated from lesions of lepromatoid leprosy in the armadillo were studied in

comparison with *Mycobacterium leprae* isolated directly from human lepromatous leprosy lesions. Three methods were used to show that the bacteria from the lesions of the armadillo were identical to those of the human lesions: (i) extraction of the bacteria with pyridine and subsequent staining with various techniques, (ii) the competence in clearing bacilli (CCB) test, and (iii) the Mitsuda test."

14. TSVETKOVA, G. M., YUSHCHENKO, A. A. & MOKHEISEN, A. M. [The pathomorphology of the skin and viscera of mice in experimental infection with *Mycobacterium leprae*, the CDVI strains.] *Vest. Derm. Vener.*, 1974, No. 8, 35-8. [In Russian.]

The English summary appended to the paper is as follows:—

"The pathomorphology of the skin and viscera of mice inoculated with different strains of *Myco. leprae* obtained and cultivated at the leprology Department of the Central Dermato-Venerology Institute (CDVI) was studied. When mice were inoculated into the right inguinal area (five series of tests), in all cases (100%) there was specific inflammation of the soft tissues at the inoculation site with great amounts of *Myco. leprae* in leprous infiltrates. Leprous granulomas with leprous cells were also found in regional lymph nodes as well as in the livers of mice containing *Myco. leprae*. Morphological examinations confirm the fact of experimental leprosy model having been obtained which is suitable for practical purposes."

15. CRAWFORD, C. L., EVANS, D. H. L. & EVANS, E. M. Experimental allergic neuritis induced by sensory nerve myelin may provide a model for nonlepromatous leprosy. *Nature*. London, 1974, Sept. 20, v. 251, 223-4.

Experimental allergic neuritis (EAN) is induced by the injection of peripheral nerve myelin and Freund's complete adjuvant into experimental animals.

In the present study, antigen prepared from human sural nerve obtained post mortem was injected with Freund's adjuvant into the footpad in one hind limb of each of nine rabbits and 16 rats. After 4-5 weeks the rabbits began to develop discrete skin lesions characterized by loss of hair without ulceration, and in some animals with coloured hair there was loss of pigment. These patches, to a total of 30, appeared in all nine rabbits; most were transient, but a few persisted for three months. Similar denuded patches appeared in many of the rats, but rather later and over a longer period. Analgesia to pinprick occurred in six of the rabbits but in none of the rats. Six of the rabbits also developed ataxia, with some motor loss, similar to that which is seen in EAN when sciatic nerve is used as antigen. This latter form of EAN has been suggested as a model for Guillain-Barre polyneuritis, a predominantly motor syndrome, but the type produced in the present study, with antigen from the sensory sural nerve, "resembles more closely the clinical and pathological features seen in nonlepromatous leprosy Histologically our experimental skin lesions resemble those of early human leprosy. . . ."

"Skin lesions similar to those in nonlepromatous leprosy have not previously been produced experimentally. The presence of lymphocytes in such skin lesions has been taken as evidence of a cell-mediated immune response directly to *Myco. leprae*. But the injection of viable *Myco. leprae* into mice has failed to reproduce these skin lesions. Our experiments suggest instead that *Myco. leprae* attack the Schwann cell of myelin of sensory peripheral nerves with release of antigen, the immune response of the patient being directed specifically against this antigen. The skin lesions of nonlepromatous leprosy are therefore essentially an autoimmune response to sensory cutaneous peripheral nerve."

F. I. C. Apted

16. OLITZKI, A. L. Effect of inorganic and organic substances containing sulfur or nitrogen and of vitamins on the growth of *Mycobacterium leprae*. *Israel J. Med. Sci.* 1974, v. 10, No. 5, 519-24.

This author and colleagues have been tackling the baffling problem of the *in vitro* culture of *Mycobacterium leprae* for many years. [For relevant references see this *Bulletin*, 1973, v. 70,

abstrs 1595 and 1804.] The results of some of his latest work (this paper was submitted for publication in April, 1973) as recorded in this paper, show that the growth of the mycobacterium, when inoculated onto a basic salt medium (disodium hydrogen phosphate (sodium phosphate) 0.125 g, potassium dihydrogen phosphate 0.25 g. and sodium chloride 6.8 g per litre) enriched by mycobacterial extracts (an ethanol extract and a sonic extract prepared from *Mycobacterium smegmatis*), is enhanced by the addition of (a) compounds containing sulphur, such as dimethyl sulphoxide (DMSO), cystine, cysteine, sodium thio-sulphate and thiamine pyrophosphate (cocarboxylase); (b) substances containing nitrogen, such as sodium nitrite, sodium nitrate, urea and uric acid; and by (c) accessory growth substances, such as ascorbic acid, biotin, folic acid, guanosine, inositol, nicotinamide and pyridoxal hydrochloride.

To forestall criticism the author discusses the crucial point as to "whether the microorganisms in our cultures were really *Myc. leprae*".

[For a recent review on the problem of the cultivation of *Myc. leprae*, the interested reader should see also PATTYN, *Bull. Wld Hlth Org.*, 1973, v. 49, 403 with 116 references.]

E. E. Vella

17. PERIASWAMI, V. **A modified technique for staining paraffin sections for acid fast bacilli.** *Lepr. India*, 1974, v. 46, No. 2, 94-8.

This is essentially a modification of the "Triff" stain [this *Bulletin*, 1965, v. 62, 418], in which picro-methyl blue is used as a substitute for saffron, which is expensive and possibly difficult to obtain. Picro-methyl blue gives differential staining of nerve and muscle. The author pretreats the sections with a hot vegetable oil.

D. S. Ridley

18. MYRVANG, B., FEEK, C. M. & GODAL, T. **Antimycobacterial antibodies in sera from patients throughout the clinico-pathological disease spectrum of leprosy.** *Acta Path. Microbiol. Scand. Sect. B*, 1974, v. 82, No. 5, 701-6.

"Sera from one hundred and thirty-nine leprosy patients, clinico-pathologically classified into seven groups, were examined for precipitating antimycobacterial antibodies by double diffusion in gel analyses. As the source of antigen, *Mycobacterium duvalii* tended to be superior to *Mycobacterium bovis* (BCG) and revealed precipitins in fifty-seven of the sera. Throughout the leprosy spectrum, the proportion of precipitin-positive sera increased from the tuberculoid to the lepromatous end giving a maximum of 73.6 per cent positive sera in the polar lepromatous (LL) group. Similarly, the number of precipitin lines also increased and in some lepromatous sera five lines were deciphered. The presence of precipitins was closely related to the density of *Mycobacterium leprae* in the skin of the patients. This suggests that the antigenic load is the main factor in determining the antibody formation in leprosy."

19. DUTTA, R. N. & SAHA, K. **Cold antibodies in leprosy and their characteristics.** *Indian J. Med. Res.* 1974, v. 62, No. 6, 869-76.

"Patients suffering from lepromatous leprosy are known to have raised levels of immunoglobulins with marked increase of various auto antibodies. We in the present paper are reporting the occurrence of raised titres of cold iso-antibodies against human group O red cells in 88 out of 142 unselected cases of leprosy patients which were found to be harmless to the host. Thirty-eight out of eighty-eight had a titre of 1:64 and above but not exceeding 1:512. Two hundred sera from normal individuals were also included as controls. The characteristics of the immuno proteins present in the cold iso-antibodies had been studied by indirect Coomb's test in 18 selected leprosy cases. In 10 patients, these were of IgM class, in 4 cases they were of IgA class, two cases IgG and one case showed only IgE. This is the first time cold antibody of IgE class is being reported. Moreover in 5 cases cold antibodies had immunoglobulins which had no light chains. Six cases had kappa light chains and 5 cases had lambda light chains in their cold iso-antibodies; 2 cases had both kappa and lambda chains and nine cases had neither kappa nor

lambda chains. The present work, in contrast to the normal cold isoagglutinins, showed the heterogeneity and inconsistency of the immunoglobulin classes of the cold antibodies present in the sera of leprosy patients. The disparity of the distributions of the light chains has also been seen in this work."

20. HOKAMA, Y., SU, D. W. P., SKINSNES, O. K., KIM, R., KIMURA, L. & YANAGIHARA, E. **Effect of C-reactive protein, PHA, PWM and choline phosphate in 3H-thymidine uptake of leukocytes of leprosy patients and normal individuals.** *Int. J. Lepr.*, 1974, v. 42, No. 1, 19-27.

"The effect of phytohemagglutinin (PHA), pokeweed mitogen (PWM), C-reactive protein (CRP) and choline phosphate (choline-PO₄) on DNA synthesis using 3H-thymidine was measured in leukocytes from active and inactive lepromatous, active tuberculoid leprosy and normal individuals. In cultures containing autologous plasma the responses of active lepromatous leukocytes to PHA and PWM were significantly lower than the normal group. The responses of active tuberculoid leukocytes to PHA were essentially similar to that of the normal control group, while the leukocytes of inactive lepromatous showed a significant increase over the control group. The leukocytic responses of inactive lepromatous to PWM were significantly lower than those of the control and active tuberculoid categories. In all groups, leukocyte responses to PHA and PWM were increased significantly with the addition of 500 µg of choline-PO₄, the exception being the control group to PWM. Choline phosphate alone had no effect on the 3H-thymidine uptake by leukocytes. Addition of γ-CRP to normal leukocytes depressed significantly 3H-thymidine incorporation and this depression was reversed by the subsequent addition of choline phosphate. Gamma-CRP was detected in all of the active lepromatous sera examined, while two of six and one of five were detected in the inactive lepromatous and active tuberculoid, respectively. It is suggested that CRP in autologous serum may, in part, be responsible for the depression of 3H-thymidine incorporation into DNA. Furthermore, the use of choline-PO₄ is suggested for cell-mediated immune studies where autologous plasma is used as part of the culture system."

21. PINTO, M. R. M. & ARSECULERATNE, S. N. **An investigation of Takahashi's antitubercle phosphatide kaolin agglutination test (KAT) in leprosy.** *Int. J. Lepr.*, 1974, v. 42, No. 1, 48-51.

"Takahashi's antitubercle phosphatide kaolin agglutination test is an easily performed serological technic, found to have diagnostic potential in tuberculosis. The test was performed on sera from leprosy patients. It was found that lepromatous patients showed a distribution of titers similar to that of tuberculous patients, while in tuberculoid disease, the distribution resembled that of sera from normal persons. The occurrence of antibodies to phosphatide antigens in both lepromatous disease and tuberculosis suggests that these antigens may be shared by *Myco. leprae* and *Myco. tuberculosis*."

[See *Bull. Hyg.*, 1962, v. 37, 1256.]

22. YAWALKAR, S. J. & SANJANA, H. B. **Effect of DDS therapy on the acetylcholine sweat function test in fifty cases of tuberculoid and maculoanesthetic leprosy.** *Int. J. Lepr.*, 1974, v. 42, No. 1, 55-7.

"This study included 19 previously untreated cases of maculoanesthetic and 31 of tuberculoid leprosy. Only typical patients showing definite loss of thermal and touch sensations were selected. Acetylcholine sweat function test (SFT) was done before and after one year of DDS treatment. There was then scarcely any significant change either in sensory impairment or in sweating. Only one tuberculoid patient presented satisfactory improvement in thermal and touch sensations, while in only one maculoanesthetic case did the SFT change from absent to moderate response. There was no change in SFT in 46 of 50 cases while in 3 cases the improvement in the SFT was negligible. After one year of DDS intake, all tuberculoid lesions

became flat and their erythema practically disappeared. In cases of maculoanesthetic leprosy, although the patches remained nearly unaltered, the margins definitely became less distinct."

23. SABIN, T. D., HACKETT, E. R. & BRAND, P. W. **Temperatures along the course of certain nerves often affected in lepromatous leprosy.** *Int. J. Lepr.*, 1974, v. 42, No. 1, 38-42.

"Temperatures along the course of the peroneal, ulnar and median nerves were obtained by placing micro-thermistors in the nerve beds of normal subjects. Significantly lowered temperatures were found in certain locations along the nerve which correlate with the loci and sequence of nerve involvement in lepromatous leprosy."

24. ENNA, C. D., BERGHOLDT, H. T. & STOCKWELL, F. **A study of surface and deep temperatures along the course of the ulnar nerve in the pisohamate tunnel.** *Int. J. Lepr.*, 1974, v. 42, No. 1, 43-7.

"The surface and deep temperatures were taken at the hypothenar eminence and the pisohamate tunnel respectively in four groups of subjects, a nonpatient and a patient control group, a group possessing ulnar clawing, and a group with ulnar-median clawing.

"The results were compared with findings reported from similar studies on the ulnar nerve at the elbow in persons without leprosy.

"The results of this study suggest that the development of ulnar neuritis at the wrist is secondary to involvement at the primary site at the elbow."

25. BULLOCK, W. E., FIELDS, J. P. & BRANDRISS, M. W. **An evaluation of transfer factor as immunotherapy for patients with lepromatous leprosy.** *New Engl. J. Med.*, 1972, v. 287, No. 21, 1053-59.

From two healthy donors "strongly skin-test positive to Dharmendra lepromin" leucocytes were obtained, and from these transfer factor was prepared. Of seven patients with lepromatous leprosy and two with borderline leprosy, five patients were given 4×10^8 lymphocytes, and four patients were given transfer factor. A table shows the effects in various patients, including induration of lesions, fever, erythema nodosum, arthralgia and neuritis. Fever was treated with prednisone for five days. Seven days after treatment, the lymphocytes of one patient were reactive to mitogens.

"Weak systemic hypersensitivity to Dharmendra lepromin" was induced in six patients, but 25 months later four of these had "reverted to negative". The clinical condition of three patients did not improve after lymphocyte transfer, and the occurrence of erythema nodosum leprosum precluded dapson treatment. The other six patients continued to receive chemotherapy and "improved slowly".

The authors have demonstrated that delayed hypersensitivity to *Mycobacterium leprae* can be transferred, but the induction of serious complications should make workers hesitate to use this therapy at least in the early stages of the disease when large numbers of bacilli are still present in the body.

C. S. Goodwin

26. GANGAL, S. G. & KHANOLKAR, S. R. **Delayed hypersensitivity *in vitro* to an acid fast mycobacterium cultivated from human lepromatous leprosy.** *Indian J. Med. Res.* 1974, v. 62, No. 2, 290-96.

"Guinea-pigs and mice were sensitized with heat-killed sonicated and frozen and thawed acid fast mycobacteria, isolated from human lepromatous leprosy and grown *in vitro*. The inhibition of migration of macrophages from sensitized animals in presence of antigens was studied. The antigens used for the studies were two strains of acid fast bacilli, isolated from lepromatous leprosy patients, lepromin prepared from fresh lepra bacilli, human serum, H₃₇Rv and PPD. The results showed cross reactivity between cultivated acid fast bacilli, lepromin and H₃₇Rv. No

cross reactivity was seen with PPD and human serum components. The cross reactivity between cultivated bacilli, lepromin and H₃₇Rv indicate shared antigens either specific to the leprosy bacillus or to the mycobacteria group.”

27. McDOUGALL, A. C. **Electron microscope studies of the antileprosy drug B663 (clofazimine; Lamprene).** *Int. J. Lepr.*, 1974, v. 42, No. 1, 1-12.

“Following the oral administration of the riminophenazine B663 (clofazimine, Lamprene) to mice at a concentration of 0.01% in their diet, tissues were taken for light- and electron microscopy. Findings from the latter are described as seen in cells of the spleen, where a dual phenomenon was observed. First, there were well-preserved spaces representing the fully formed crystal of drug, but dissolved out during processing; and second, osmiophilic ‘rods’ or ‘bands’ which had obviously retained their substance, and which showed linearity at high magnification on the electron microscope, and a lattice spacing on optical diffraction in the range $33-41 \pm 2 \text{ \AA}$ were noted.

“Drug deposits were seen in macrophages, multinucleate cells, and occasionally in neutrophil polymorphonuclear cells. Membranes have been demonstrated around crystal spaces and osmiophilic rods. The location of B663 in the cytoplasm of these cells, and the possible significance of the osmiophilic ‘rods’ are discussed.”

28. MATSUO, Y. **The effect of rifampicin on *Mycobacterium leprae* in mice.** *Jap. J. Microbiol.*, 1974, v. 18, No. 1, 15-19.

The author considers that the administration of drugs orally by tube as a single daily dose is a better method of testing in animals than administration as a percentage of the diet. Given in this way, rifampicin was found to inhibit completely the growth of *Mycobacterium leprae*, 16 weeks after inoculation of mice, at a daily dose of 0.1 mg, three times a week for 15 weeks. The inhibition continued for at least 13 weeks after cessation of treatment. A low dose of rifampicin was more effective when given in combination with a low dose of DDS. Using the kinetic method of testing, it was found that rifampicin 1.0 mg daily from the 30th to the 34th week of infection left no viable bacilli. Pre-treatment of *Myco. leprae* in a suspension *in vitro* with 0.5 mg rifampicin per ml caused partial loss of viability.

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